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asbestos-free products were available, and that an asbestos-free product was required for the project.

148 Support for that argument is found in the evidence of Mr. Alfred Roberts, an experienced architect who was called by the plaintiffs and qualified to give expert evidence concerning the interpretation of architectural specifications and acceptable standards of practice in the profession. Mr. Roberts testified that, in his opinion, the Drexel letter:

... should have been sufficient to alert a reasonably competent architect with adequate knowledge of Mono-Kote [sic], to question the use of a material containing asbestos. In specifying a product for spray fireproofing a reasonably competent architect should have ascertained if a product was to be used which did contain asbestos, whether any problems existed which may prevent that product being used and to record such findings for future reference.

149 Mr. Thomas Cattell, a Vancouver architect and one of Eng & Wright's expert witnesses, holds a similar opinion. In a passage which was left out of his final report, but which, under cross-examination, he acknowledged to be an accurate reflection of his opinion, Mr. Cattell stated:

The letter of December 14, 1972 from the F. Drexel company to Don Thomas forwarding data relative to a non-asbestos sprayed on fibre insulation, and a comment on this material's desirability may have alerted Eng & Wright to the issue of asbestos content in the materials they intended to use on their project. There is no question therefore that they were made aware of the issue of asbestos fiber in 1972, well before the commencement of construction during the period 1974 to 1976.

150 Whether or not MK-3 was a "hazardous" product remains to be determined but, clearly, Mr. Wright and Mr. Thomas ought to have been familiar with its composition before drafting the specification. They were not. Eng & Wright had never before specified the use of Monokote or "Monocote" yet, despite Drexel's emphasis of the fact that their product was a "Non-asbestos" spray and that such a material would be "desirable", neither Mr. Wright nor Mr. Thomas took any steps to find out whether "cementitiously applied Monocote [sic]" contained asbestos. Mr. Wright left the matter in Mr. Thomas's hands, and Mr. Thomas did nothing because he believed that "Monocote [sic]" was asbestos-free.

151 I find that Mr. Wright, as the responsible architect, and Mr. Thomas, as the specification writer, should have known, or should have made enquiries in order to ascertain, the contents of "cementitiously applied Monocote [sic]" before specifying it for installation in the Building.

152 However, in my opinion, the Paine specification and the Drexel letter, whether considered alone or together, were not in themselves sufficient to convey to Messrs. Wright and Thomas the realization that an asbestos-free material was *required* by the owners of the Building. And, as noted above, no such requirement was ever stipulated.

153 As to the wording of the Eng & Wright specification itself, Thomas Cattell testified that, in his opinion, Monokote MK-3 was an acceptable specification to make in the 1972-1975 time period, notwithstanding its asbestos content. Other evidence demonstrates that during that period MK-3 was still being specified for many projects.

154 For example, in 1972 or 1973, Alfred Roberts' firm, Craig, Zeidler & Strong of Toronto, specified MK-3 for installation in the new Health Sciences Centre at McMaster University in Hamilton, Ontario. Mr. Roberts was himself directly involved in the preparation of the specifications for that job, and when questioned about it, he testified as follows:

Q. And at the time that you were on this project in '70 to '72, you were aware that what you were spraying on those trusses was sprayed asbestos?

A. I don't know that I was aware it was sprayed asbestos. I was aware it was sprayed Monokote.

Q. And you didn't know it contained asbestos?

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A. At that point in time I'm not sure when I knew it contained -- I just didn't -- I can't remember that far back.

155 However, in 1974 or 1975, by which time he did know that there were different formulations of Monokote, and that at least one of them contained asbestos, Mr. Roberts approved another specification calling for the installation of "Monokote" simpliciter in a hospital.

156 Other architects testified that the specification of Monokote simpliciter was within the standard expected of a reasonable and prudent architect during the years 1972 to 1975. For example, Mr. John Sievenpiper, an architect called by Webb Zerafa to give expert opinion evidence, testified as follows:

Q. Now, changing topics, Mr. Sievenpiper, in your opinion, was it appropriate for an architect practising in Canada in 1974 and 1975 to specify Monokote without any requirement that it be asbestos-free?

A. Yes. Monokote was a cementitious material. It was encapsulated and it was a reputable manufacturer and it had a track record and at that period of time there didn't seem to be any reason why you would not -- compelling reason why you would not specify it.

157 Further evidence confirming the acceptability of the specification of "Monokote" simpliciter came from Mr. Karl Fraser. He has been involved in the spray fireproofing business for nearly 25 years. Called by the Grace defendants, he testified that when the Building was renovated in the 1970s, he submitted a bid for the installation of the spray fireproofing. When asked about the bid, he testified as follows:

Q. What fireproofing did you bid on?

A. We ended up submitting our tender for the Monokote MK-3 in the retail base and Monokote MK-4 for the tower fireproofing.

Q. Did the retail base area have any specific name, to your recollection?

A. I believe it was the Spencer Building, that was the name of it. It was an older building.

Q. That was the building that was being re-fitted or renovated?

A. Yes, that was the existing structure they were adding some structural steel to and then adding whatever it called for to bring the building up to code at the time, I believe.

Q. Why did you bid this job on the basis of two of Grace's fireproofing products rather than simply one?

A. There was two separate specifications for -- one for the tower and one for the retail base. The one for the tower specifically called for Monokote MK-4 asbestos free and the one for the retail base called for Monokote which was MK-3 ...

Q. What was your understanding of the tower specifications, vis-à-vis your understanding of the specifications for the retail area?

A. The specifications for the tower clearly called for Monokote MK-4 and the specifications for the retail base was Monokote MK-3, the standard Monokote.

Q. Did you see the word "MK-3" or the phrase "MK-3" in the retail specification?

A. No. It is not referred to, I believe, in the section as Monokote MK-3, just Monokote and at that time the generic term for Monokote MK-3 was Monokote. Everybody used "Monokote" and it was Monokote MK-3. It was the most

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predominant Monokote used at that particular time. If you were spraying a job with Monokote you used Monokote MK-3, unless somebody requested otherwise.

158 Accordingly, subject to consideration of the allegations as to the inherently hazardous nature of Monokote MK-3, I am satisfied that the specification of "cementitiously applied Monokote [sic]" was an acceptable one at that time.

## V. The Limitation Period

159

### Introduction

160 The defendants submit that even if the plaintiffs have a valid cause of action against any of them (which, of course, they deny), their claims are barred by the provisions of the *Limitation Act*, R.S.B.C. 1979, c. 236. They say that:

- 1) if a cause of action ever existed, it arose during the period 1973 to 1975, when the fireproofing was installed, and the limitation period began to run by the fall of 1975, when the work was completed;
- 2) the plaintiffs' claim is not for injury to person or to property as alleged, it is for pure economic loss and the applicable limitation period is six years;
- 3) in the alternative, if it is found that there was injury to property, the applicable limitation period is two years;
- 4) in the further alternative, the limitation period began to run, at the very latest, in May 1986, when it was brought to the attention of the plaintiffs that asbestos-containing MK-3 had been installed in the building in 1975; and
- 5) the plaintiffs have not pleaded that the running of the limitation period should be postponed to a date which would bring the commencement of this action within the applicable limitation period and, in any event, they have failed to meet the onus of proving why such a postponement should occur.

161 In *Lui v. West Granville Manor Ltd.* (1985), 61 B.C.L.R. 315 at 320- 21, the British Columbia Court of Appeal (Lambert J.A.) observed that:

The limitation of actions was introduced by statute. The judge-made common law did not impose limitation periods. The first comprehensive limitation statute was passed in England in 1623 (21 Jac. 1, c. 16). The policy behind that statute and successor limitation statutes is clear. There should be an end to bickering. Differences should be brought to an end when it is still possible to reach an informed conclusion about disputed events. So an arbitrary but firm deadline is drawn as a matter of legislative policy. After the deadline has passed, the incident is closed. No discretion is left to the courts to try to temper the arbitrary deadline with considerations of justice or fairness.

162 And, in a more recent decision, the same court per curiam ascribed the following purpose to the imposition of time limits on the rights of persons to commence legal proceedings (*Levitt v. Carr* (1992), 66 B.C.L.R. (2d) 58 at 66-67 [[1992] 4 W.W.R. 160]):

The reasons for the bar itself are well known: society has an interest in putting an end to the process of litigation which from its nature is rendered susceptible to abuse and injustice with the passage of time.

## Discussion

### A. When Does Time Begin to Run Under the Act?

163 Assuming for the purpose of this discussion that an actionable wrong was committed by one or more of the

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defendants, the first question to be decided is: when did the cause of action in respect of that wrong arise? For it is from that date (subject to the effect of the postponement provisions, which will be considered later) that time begins to run for the purposes of the *Limitation Act*.

164 Section 3 of the Act provides, in part, that:

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3. (1) After the expiration of 2 years after the date on which the right to do so arose a person shall not bring an action

(a) ... for damages in respect of injury to person or property, including economic loss arising from the injury, whether based on contract, tort or statutory duty.

(4) Any other action not specifically provided for in this Act or any other Act shall not be brought after the expiration of 6 years after the date on which the right to do so arose.

165 In *Bera v. Marr* (1986), 1 B.C.L.R. (2d) 1 [[1986] 3 W.W.R. 442], the British Columbia Court of Appeal (Esson J.A.) held at p. 14 that:

The Limitations Act, as appears from ss. 3(2) and 8(1), defines the beginning of the period of limitation as being the date on which the right to bring action arose. That must mean the date upon which the cause of action was complete; the date upon which all the elements of the cause of action had come into existence, whether or not the person entitled to the cause of action was aware of all the facts upon which its existence depended.

166 That conclusion was affirmed by the Court of Appeal in *Karsanjii Estate v. Roque* (1990), 43 B.C.L.R. (2d) 234 [[1990] 3 W.W.R. 612].

167 Nonetheless, the plaintiffs maintain that a cause of action does not arise until all of the material facts on which it is based have been discovered, or ought to have been discovered, by the plaintiff upon the exercise of reasonable diligence. As authority for that proposition, they rely upon the decision of the Supreme Court of Canada in *Central & Eastern Trust Co. v. Rafuse* (1986), (sub nom. *Central Trust Co. v. Rafuse*) 31 D.L.R. (4th) 481, and argue (as stated in the plaintiffs' written reply argument) that:

The key difference between the plaintiffs and the Grace defendants as to when the cause of action accrued turns on whether or not the [Supreme Court of Canada's] decision in *Central Trust Co. v. Rafuse* (cite given) applies in B.C., and thus, whether or not the common law "discoverability" rule applies to the accrual of a cause of action.

168 With respect, that issue has already been decided.

169 *Central Trust Co. v. Rafuse* is a Nova Scotia case. The *Statute of Limitations* of that province did not (at least, when the case was tried) contain postponement provisions comparable to those found in the British Columbia statute, and, for that reason, its application was rejected by the Court of Appeal of this province in *Wittman v. Emmott* (1991), 53 B.C.L.R. (2d) 228 [[1991] 4 W.W.R. 175]. Writing for the court, Wallace J.A. said at pp. 236-37:

If the court accepts that the decision in *Central Trust* stands for the proposition that when calculating limitation periods the cause of action arises, as a "general rule," when the material facts are discovered or are reasonably discoverable, the issue becomes whether or not such a "general rule" should be applied to the interpretation of the British Columbia Limitation Act.

To reach a conclusion on this issue I have kept the following considerations in mind:

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(1) For purposes of ss. 3 and 8 of the British Columbia Limitation Act, the date which marks the commencement of the limitation period is the date on which the right to bring an action arose. There can be no doubt that the "right" to bring an action in tort arises when the negligence and consequent damage occurs. This is in accord with the decision of this court in *Bera* (pp. 25-27) and has been the traditional interpretation for over 100 years ... The "right" to bring an action clearly does not arise only when the negligence and damage are discovered, as was suggested by counsel for the appellants.

In light of the language used in the Limitation Act, it would be difficult to justify the incorporation of discoverability into either s. 3 or s. 8. To do so would be to depart from the ordinary meaning of the words used in the legislation and to give the words the "right to bring an action" a meaning alien to that by which they have been traditionally understood.

(2) The Limitation Act has expressly made special provisions to avoid, in certain specific circumstances, the injustice of a statute-barred claim before a plaintiff is even aware of its existence. Pursuant to s. 6(1) and (3) the running of time within which to bring an action is postponed until the plaintiff has knowledge or means of knowledge of the relevant facts. The inclusion of these sections in the Act indicates the legislature considered the right to bring an action in tort arises when the negligence and consequent damage occurs regardless of the plaintiff's lack of knowledge. Had the legislature considered that the right to bring an action arose only upon the discovery of that negligence and damage, these postponement provisions would not have been necessary ...

I adopt the language of Esson J. in *Bera* wherein he stated (at p. 27):

There are strong policy reasons for not construing the date as of which the right to bring action arose in a manner different from that which has heretofore been given to them in the Limitation Act. To do so would be destructive of a balanced legislative scheme. Sections 6 and 8 are obviously designed to work together with s. 3(1) to provide relief against the injustice which can be created by hidden facts and, on the other hand, to provide reasonable protection against stale claims. All of that is premised upon the 'right to do so' meaning the date of accrual of the cause of action without reference to knowledge. If that premise is disturbed, s. 6 will be made more difficult of application and s. 8 will cease to provide any real protection against stale claims.

170 Leave to appeal the decision in *Wittman* was refused by the Supreme Court of Canada: (1991), 58 B.C.L.R. (2d) xxxiv [[1991] 6 W.W.R. lxvii].

171 Therefore, it is clear that in this province a cause of action accrues when all of the constituent elements exist, whether or not the plaintiff is then aware of them.

#### ***B. When Did the Plaintiffs' Cause of Action Accrue?***

172 I think it is clear that all of the elements necessary to the plaintiffs' cause of action came into existence during the period 1973 to 1975, when the MK-3 was installed in the Building. Accordingly, the limitation period began to run in or about the month of September 1975, when the installation was completed. I need not fix an exact date because, regardless of whether the applicable limitation period is two years or six years, it had expired when this action was commenced, unless the plaintiffs can establish that the postponement provisions of the *Limitation Act* apply.

#### ***C. What is the Applicable Limitation Period?***

173 This question must be considered next, because how the plaintiffs' action is categorized will determine the next issue; that is, whether or not the postponement provisions apply.

174 Once again, for convenience, the relevant sections of the *Limitation Act* are as follows:

3. (1) After the expiration of 2 years after the date on which the right to do so arose a person shall not bring an action

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(a) ... for damages in respect of *injury to person or property, including economic loss arising from the injury*, whether based on contract, tort or statutory duty.

(4) Any other action not specifically provided for in this Act or any other Act shall not be brought after the expiration of 6 years after the date on which the right to do so arose. (emphasis added)

175 Because there is no allegation in this case of "injury to person", the issue is whether the plaintiffs' claims can be categorized as being in respect of "injury to property". If so, the limitation period is two years. On the other hand, if it is an action "not specifically provided for", a six-year limitation period applies.

176 The defendants submit that the plaintiffs' property was not injured within the meaning of the Act, and that any loss they might have suffered was pure economic loss rather than economic loss arising from injury to property.

177 The phrase "injury to property" is not defined in the Act, but its meaning in the context of s. 3(1)(a) was considered by the Court of Appeal of British Columbia in *Alberni District Credit Union v. Cambridge Properties Ltd.* (1985), 65 B.C.L.R. 297. The plaintiff in that case alleged that there were deficiencies both in the materials used to install a vault door and in the manner of its installation. Esson J.A. (as he then was) found that the claim was with respect to an inherent defect; the Court held at p. 300 that it fell under s. 3(4) of the Act rather than under s. 3(1)(a) because the word "injury", as it appears in s. 3(1)(a):

... imports something in the nature of physical injury or damage. This building simply has not, in plain language, been injured. So the action is not one in respect of injury to property. It may be, as the defendants assert, that the defect has resulted in some physical damage or injury. But, in the old language, that is not something which is the gist of the cause of action.

178 The meaning of the phrase "injury to property" was again considered by our Court of Appeal in *British Columbia (Workers' Compensation Board) v. Thompson Berwick Pratt & Partners* (1986), (sub nom. *Workers' Compensation Board (British Columbia) v. Genstar Corp.*) 24 B.C.L.R. (2d) 157 [[1988] 4 W.W.R. 184]. There, the action had been brought to recover the cost of remedying an existing inherent structural defect in a faulty concrete beam. Writing for the court, McLachlin J.A. (as she then was) said at pp. 161-62:

I am persuaded by the authorities that "injury to property" refers to the situation where property is damaged by an extrinsic act, and not to the situation where a claim is made for damage occasioned by defects in the property itself ...

Policy considerations support the conclusion that "injury to property" refers to damage caused by *an identifiable external event*. A short limitation period of two years is appropriate where the claim is based on an event which causes direct injury to property. Such a short limitation period may not be appropriate for a claim based on defects in property which may not manifest themselves clearly for some time, even though with the benefit of hindsight one may be able to say that their onset was revealed at an earlier date. (emphasis added)

179 A recent decision of our Court of Appeal has affirmed that approach: *Zurbrugg v. Bowie* (1992), 68 B.C.L.R. (2d) 322 [[1992] 5 W.W.R. 314].

180 The issue was also considered by Holmes J., of this court, in *Ridley Terminals Inc. v. Mitsubishi Canada Ltd.*, unreported (March 2, 1993), Vancouver No. C903214 [reported 16 C.L.R. (2d) 86]. There, due to an inherent structural defect, structural parts of the plaintiffs' stacker-reclaimer failed and fell to the ground. The plaintiffs argued that they were unaware of any defect in the stacker-reclaimer until it collapsed.

181 With respect to the limitation issue that was raised, Mr. Justice Holmes found at p. 4 [p. 89] that:

If what occurred ... to cause the collapse of the stacker reclaimer can be properly characterized as "injury to

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property" the two-year period is applicable; if not, the limitation period is six years (s. 3(4) of the *Limitation Act*).

At p. 6 [pp. 89-90]:

The evidence in this case, as I understand it to be, is wholly consistent with the collapse of this stacker/reclaimer being caused by an under-design of a structural component which led to fatigue-cracking over a lengthy period of time, which by eventual crack propagation from stress of constant use, finally culminated in a component failure which led to major structural collapse. There was no single identifiable extrinsic event which occurred causing this damage, and to characterize it as such because it occurred during normal service under-load would be a misapprehension of the meaning of "an identifiable external event" as that has been referred to in the authorities.

182 After referring to what he described as the "distinct line of British Columbia Court of Appeal authority interpreting s. 3(1)(a) of the Act", Holmes J. stated at p. 5 [p. 89] that:

The effect of these decisions is that "injury to property" requires *direct damage from an extrinsic act or an identifiable external event*. (emphasis added)

183 In my view, the cause of the damage alleged in the present case was not "an identifiable external event". Therefore, the plaintiffs' claim is not one for "injury to property".

184 The plaintiffs agree with that conclusion; they acknowledge that the damage that they allege occurred -- the "contamination" of the Building and various of its components -- does not fit within the meaning of "injury to property". They also agree that the applicable limitation period is six years, but they dispute the assertion that their claims are for pure economic loss.

185 I will discuss the recoverability of economic losses in more detail later, but for the time being, it will suffice if I note that the real "gist" of the plaintiffs' claim is for the recovery of the costs and loss of revenue associated with the removal and replacement of a product alleged to be inherently defective. That sort of claim cannot be categorized as one for "injury to property". It is a claim for pure economic loss and, as such, falls within the ambit of s. 3(4) of the Act.

#### *D. Do the Postponement Provisions Apply?*

186 This is the crux of the matter.

187 Sections 6(3)-(5) of the Act stipulate the following:

(3) The running of time with respect to the limitation periods fixed by this Act for an action

(a) for personal injury;

(b) for damage to property;

(c) for professional negligence ...

is postponed and time does not commence to run against a plaintiff until the identity of the defendant is known to him and those facts within his means of knowledge are such that a reasonable man, knowing those facts and having taken the appropriate advice a reasonable man would seek on those facts, would regard those facts as showing that

(i) an action on the cause of action would, apart from the effect of the expiration of a limitation period, have a reasonable prospect of success; and

(j) the person whose means of knowledge is in question ought, in his own interests and taking his circumstances

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into account, to be able to bring an action.

(4) For the purpose of subsection (3),

(a) "appropriate advice", in relation to facts, means the advice of competent persons, qualified in their respective fields, to advise on the medical, legal and other aspects of the facts, as the case may require;

(b) "facts" include

(i) the existence of a duty owed to the plaintiff by the defendant; and

(ii) that a breach of a duty caused injury, damage or loss to the plaintiff;

(c) where a person claims through a predecessor in right, title or interest, the knowledge or means of knowledge of the predecessor before the right, title or interest passed is that of the first mentioned person ...

(5) The burden of proving that the running of time has been postponed under subsection (3) is on the person claiming the benefit of the postponement.

188 The plaintiffs submit that regardless of how one characterizes their claims, whether for injury to property or for economic loss, their claims arise from *damage* to property. They allege that the "episodic" release of fibres has caused damage to the Building and argue that the phrase "damage to property", as it is used in s. 6(3)(b), includes all kinds of damage, not only what they refer to as "obvious damage", amounting to "injury to property" within the meaning of s. 3(1)(a). They say that it also includes damage that is not "obvious". Accordingly, they say, s. 6(3)(b) applies in the circumstances of this case.

189 In the alternative, the plaintiffs say that the claims made against each of the defendants are based upon acts performed and omissions made by them in a professional capacity, and for that reason s. 6(3)(c) of the Act applies.

190 The plaintiffs submit that for all, or any, of those reasons, the running of the six-year limitation period was postponed until the discovery of the asbestos in the building in March 1987, and that the "new" parties were added within six years of that date, Grace-Conn. having been added on October 9, 1990, and the plaintiffs, Lordina and Polaris Western, on January 8, 1992.

191 In Foundation's summary judgment application (see *Privest Properties Ltd. v. Foundation Co. of Canada* (1991), 6 C.C.L.I. (2d) 23 [57 B.C.L.R. (2d) 88] (B.C.S.C.)), I considered the meaning of the phrase "property damage" in the context of several insuring agreements and the insurers' duty to defend. After reviewing many Canadian, British and American authorities, I held that (see p. 65):

... none of the claims that have been advanced against Foundation (including those found in Grace Canada's third party notice), even when given the broadest possible interpretation, can be construed as allegations of a state of facts which, if proven, would constitute physical injury or damage to or loss of use of tangible property.

## Conclusions

192 Notwithstanding the subsequent further amendment of the Statement of Claim, having now heard the evidence and further submissions of counsel, my earlier conclusion as to the nature of the plaintiffs' claims, and whether they constitute damage or injury to property, remains unaltered.

193 The condition of the Building is more fully discussed in a subsequent section, but it will suffice at this point to state that, in my view, the evidence does not support a finding that there has been any "damage" whatsoever. Whatever the different meanings intended by the use of the phrase "damage to property" (in s. 6), as opposed to that of "injury to property" (in s. 3), I am satisfied that this claim is one for the recovery of pure economic loss, and accordingly, does not fall within the



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ambit of either of the two phrases.

194 The plaintiffs also argue that some of the fixtures in the building were damaged by asbestos fibres and, for that reason, they say, their claim is for damage to property rather than for pure economic loss. However, the evidence shows that fixtures removed from the third and fourth floors were discarded, not because they were damaged, but because they were not going to be utilized by the Department of Fisheries and Oceans. And, many of the fixtures that were removed from other parts of the Building were replaced as part of an already planned upgrading process. In other instances, fixtures were discarded because debris fell on them during the renovation operations, while some were cleaned up and reused.

195 On the evidence, I have concluded that the removal of the light fixtures was, in the main, part of the general removal process. Any real "physical damage" to light fixtures was minor. Most were removed and discarded solely because the cost of cleaning them up would be greater than the cost of installing new fixtures.

196 With respect to the plaintiffs' argument that their claims may be characterized as claims for "professional negligence", it must first be noted that the claims were not expressly pleaded in that fashion, and that the argument was raised for the first time in the plaintiffs' written Reply Argument. Earlier in these reasons, I outlined the nature of the plaintiffs' claims against each of the defendants and it may be arguable that the claims of negligence on the part of Eng & Wright Partners do, by virtue of their professional status, fall within the category of professional negligence. So, too, may the claims made in negligence against Foundation. But I am unable to read into any of the allegations made in the Seventh Amended Statement of Claim any suggestion of "professional negligence" on the part of Donalco and the Grace defendants.

197 If I am wrong in concluding that, first, the plaintiffs' claims are for pure economic loss rather than "damage to property" within the scope of s. 6(3)(b) and, second, that none of their claims are for "professional negligence" within s. 6(3)(c), I am nevertheless satisfied that the postponement provisions have no application to these facts.

198 The plaintiffs' argument under this section is premised on the assertion that they simply did not know that the fireproofing contained asbestos and, therefore, the running of time should be postponed until their "discovery". For the reasons given in the "Knowledge" section, I have rejected that assertion. The plaintiffs were aware of the controversies surrounding asbestos and, in my opinion, they either knew or ought to have known that MK-3 contained asbestos. All of the factors necessary to an action regarding the MK-3 existed as of the date of completion of its installation. Accordingly, the limitation period began to run as of that date, without postponement.

199 It follows, therefore, that the plaintiffs' claims are barred by the provisions of the *Limitation Act*.

## VI. Economic Loss

200 I turn now to an argument advanced by Donalco and the Grace defendants concerning the nature of the plaintiffs' claim. They say that it is for pure economic loss, i.e., a loss where there has been no injury to person or damage to property and that, as a matter of law, it is not recoverable.

201 In support of their position, Donalco and Grace rely in part on the decision of the Supreme Court of Canada in *Rivtow Marine Ltd. v. Washington Iron Works* (1973), [1974] S.C.R. 1189 [1973] 6 W.W.R. 692. In that case, the plaintiff, after repairing a dangerously defective crane, had sought to recover in tort the costs of the repairs, as well as the loss of profits from having to take the crane out of service to complete the repairs. The majority of the Court concluded that, while there may be a duty to warn of such dangers, there should be no recovery in tort in the absence of injury to person or damage to property. Accordingly, as there was no privity of contract between the plaintiff and the original manufacturer, the plaintiff was denied recovery for the cost of repairing the defect.

202 The plaintiffs' primary answer to *Rivtow*, and to the English authorities that reached a similar conclusion, is that their claim is one for property damage, not for economic loss. For reasons which I explained in the section dealing with the *Limitation Act*, I have rejected this characterization of the claim. In my view, their claim is one for pure economic loss.

203 In the alternative, the plaintiffs submit that their claims should succeed on the basis of a breach of a duty to warn or

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negligent misrepresentation.

204 In the further alternative, they argue that the rule prohibiting claims for economic loss cases such as this had been placed in doubt by the dicta of the Supreme Court of Canada. Armed with comments from various members of the Court indicating their dissatisfaction with the majority opinion in *Rivtow*, the plaintiffs argued that the Court has implicitly overruled the ratio of the case: see, e.g., *Nielsen v. Kamloops (City)*, [1984] 2 S.C.R. 2 [66 B.C.L.R. 273, [1984] 5 W.W.R. 1]; *Ontario (Attorney General) v. Fatehi*, [1984] 2 S.C.R. 536; and most recently in *Canadian National Railway v. Norsk Pacific Steamship Co.*, [1992] 1 S.C.R. 1021. Accordingly, they say that the question of whether or not a duty arises should be determined with reference to the two-step test articulated by the House of Lords in *Anns v. Merton London Borough Council*, [1977] 2 All E.R. 492 (H.L.), and refined by the Supreme Court of Canada in *Kamloops*.

205 Events have overtaken us and it is not necessary for me to address the alternate arguments advanced by the plaintiffs. As their counsel foretold, the Supreme Court of Canada has, in its recent decision, *Winnipeg Condominium Corp. No. 36 v. Bird Construction Co.*, [1995] 1 S.C.R. 85, 23 C.C.L.T. (2d) 1 [[1995] 3 W.W.R. 85], turned away from the majority decision in *Rivtow* and adopted the reasoning expressed by Laskin J. in his dissenting judgment. The Supreme Court has concluded that claims in tort for the cost of repairing a dangerous defect in a building should be governed, not by a broad rule excluding recovery, but rather on a case-by-case basis, utilizing the test set out in *Anns*.

206 Although the claim in this case relates to an allegedly dangerous product installed in a building, the reasoning of the Court has obvious application.

207 In *Winnipeg*, the plaintiff purchased an apartment building in 1978, six years after its construction. In 1989, an exterior section of stone cladding fell from the building. Following consultation with structural engineers, it was determined that the entire stone cladding had to be replaced, at a cost of approximately \$1.5 million. The plaintiff brought an action in negligence against the general contractor, the stonework sub-contractor, and the architects -- all people with whom it had no privity of contract.

208 The defendants moved for summary dismissal of the action, but were unsuccessful at the trial level [(1992), 84 Man. R. (2d) 23]. The Manitoba Court of Appeal allowed the appeal [[1993] 5 W.W.R. 673], concluding that recovery for this type of economic loss was precluded by the Canadian and English authorities. On further appeal to the Supreme Court of Canada, a seven-member bench unanimously agreed to allow the appeal.

209 Writing for the Court, La Forest J. began by stating the issue in these words (at p. 90):

May a general contractor responsible for the construction of a building be held tortiously liable for negligence to a subsequent purchaser of the building, who is not in contractual privity with the contractor, for the cost of repairing defects in the building arising out of negligence in its construction?

210 Mr. Justice La Forest first noted that there was no allegation of damage to property or injury to person, and that the claim was "simply for the cost of repairing the allegedly defective masonry and putting the exterior of the building back into safe working condition" [p. 98]. He then proceeded to analyze the issue on the basis that the losses claimed were purely economic.

211 La Forest J. considered the English position on recoverability, as set out in *D & F Estates Ltd. v. Church Commissioners for England*, [1988] 2 All E.R. 992. In that case, the House of Lords concluded that a subsequent purchaser of a building that contained defects (falling plaster) could not recover from the original contractor the cost of repairing the defect because there had been no injury to person or damage to property. The House of Lords' conclusion was, of course, consistent with the Supreme Court of Canada's decision regarding defective chattels articulated many years earlier in *Rivtow*.

212 La Forest J. concluded that the reasoning in *D & F Estates* should not be considered persuasive authority in Canada because of the very different developments in tort law between the two countries. For example, La Forest J. noted that the House of Lords assumed that a duty can only arise in contract, and that an extension of liability in tort was an inappropriate

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incursion into the contractual realm. However, as La Forest J. noted, Canadian courts have opted for a different approach, having recognized that a duty of care in tort may arise co-extensively with a contractual duty: *Central Trust Co. v. Rafuse*, [1986] 2 S.C.R. 147.

213 La Forest J. also pointed out that Canadian and English courts have diverged on their approach to the recoverability of economic loss in general. In Canada, recoverability for economic loss continues to be governed by Lord Wilberforce's two-step test outlined in *Anns* (see *Canadian National Railway v. Norsk Pacific Steamship Co.*, supra). By contrast, the House of Lords in *Murphy v. Brentwood District Council*, [1990] 2 All E.R. 908, overruled its decision in *Anns* and reverted to a much narrower exclusionary rule for the recovery of economic loss.

214 La Forest J. found that there were compelling policy reasons for recognizing a duty in tort. It made good sense, he concluded, to hold a person who negligently creates a danger within the community to account for their negligence; such a duty would, he said, serve an important preventative function by encouraging "socially responsible behaviour". La Forest J. noted that Laskin J. had recognized these concerns in his strongly worded dissent in *Rivtow*, and he accepted and adopted Mr. Justice Laskin's reasoning on this point.

215 La Forest J. then turned to the modified test in *Anns* to resolve the appeal. On the first part of the test -- whether there was a sufficient relationship of proximity or neighbourhood between the contractor and the subsequent purchaser -- La Forest J. had little difficulty. He held that it is reasonably foreseeable to contractors that, if they design or construct a building negligently, and if that building contains latent defects as a result of that negligence, subsequent purchasers of the building may suffer personal injury or damage to other property when those defects manifest themselves. In his view (at p. 116):

... the reasonable likelihood that a defect in a building will cause injury to its inhabitants is also sufficient to ground a contractor's duty in tort to subsequent purchasers of the building for the cost of repairing the defect if that defect is discovered prior to any injury and *if it poses a real and substantial danger to the inhabitants of the building.* (emphasis added)

216 In the following passage, Mr. Justice La Forest set out the Court's conclusion with respect to the first branch of the *Anns* test [p. 121]:

I conclude that the law in Canada has now progressed to the point where it can be said that contractors (as well as subcontractors, architects and engineers) who take part in the design and construction of a building will owe a duty in tort to subsequent purchasers of the building if it can be shown that it was foreseeable that a failure to take reasonable care in constructing the building would create defects that pose *a substantial danger* to the health and safety of the occupants. Where negligence is established and such defects manifest themselves before any damage to persons or property occurs, they should, in my view, be liable for the reasonable cost of repairing the defects and putting the building back into a non-dangerous state. (emphasis added)

217 He also stated that the contractor's duty would not be subject to any limitations of liability contained in the contract between the original purchaser and the contractor.

218 La Forest J. then considered the second branch of the *Anns* test; that is, whether there were any considerations which ought to negate either the scope of the duty, the class of the persons to whom it is owed, or the damages to which a breach of it may give rise. He noted that concerns have been expressed that such a duty interferes with contractual duties and with the doctrine of caveat emptor. He suggested that these could be characterized as "Cardozian" concerns, in that they relate to averting indeterminate liability for an indeterminate time to an indeterminate class.

219 He rejected those concerns. He noted that the duty was limited by the requirement that the defects be dangerous, and that neither the class (subsequent purchasers), nor the time (the life of the building), nor the liability (limited to the cost of repairs), were indeterminate. As to the caveat emptor concern, La Forest J. observed that the purchaser was clearly not in the best position to inspect the building and to bear the risk of latent defects. Having addressed these concerns, La Forest J. concluded that there were no adequate policy considerations to negate a duty in tort.

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220 It is now clear that under Canadian law a builder may be held liable in tort when he has constructed a building in a negligent manner and, subsequently, a substantially dangerous defect is discovered and then repaired prior to any injury occurring to person or property. In my view, the same principle must apply to one who negligently manufactures a product, knowing that it will be incorporated into a building, if that product is later found to be dangerously defective in that it poses a "real and substantial danger" of causing injury to persons or property.

### **Conclusion**

221 Notwithstanding that their claim is for pure economic loss, the plaintiffs may recover that loss if they are able to establish, on a balance of probabilities, that the presence of MK-3 in the Building posed a "real and substantial" danger to workers and occupants, that the danger was caused by negligence, and that the removal and replacement of the product was necessary in order to alleviate the danger.

### **VII. Ownership/Status Issues**

222 Counsel for the Grace defendants describe as "vitally important" certain issues that arise from the history of ownership of the Building during the time when the MK-3 was installed and when, allegedly, the plaintiffs first learned of its presence and launched the programme of abatement.

223 Certified copies of documents registered in the Vancouver Land Title Office were filed and these chronicle the relevant history of ownership. They show that prior to August 1973, the Building was owned by Vancouver Square Holdings Limited ("VSH") and PPI Vancouver Limited, and that on or about August 9, 1973, they transferred the title to VSH as sole owner. On August 29, 1973, VSH transferred the title to Lord Realty. Lord Realty remained the sole *registered* owner of the Building until November 22, 1974, when it transferred a 50% interest to its wholly-owned subsidiary, Lordina, and the remaining 50% interest to Privest.

224 I emphasize the word "registered" because, on December 1, 1973, prior to the incorporation of Privest, Lord Realty entered into an Agreement with one James Tory by which it agreed to transfer a 50% interest to Mr. Tory to be held by him in trust for Privest. Quite apart from questions concerning the implementation of that agreement, and whether it effectively transferred a beneficial interest in the Building to Privest, it is clear that Mr. Tory never became a registered owner of any interest in the Building, either in his personal capacity or as a trustee.

225 Privest was incorporated in the Province of Ontario on April 4, 1974, and it was not until November 15, 1974 that it was registered as an extra-provincial company under the B.C. *Companies Act*. The Grace defendants argue that it follows from that fact that Privest could not have held any interest, registered or unregistered, in land in British Columbia until that date.

226 Neither of the Polaris companies ever held an ownership interest in the Building, no claims have been made against them by the owners, and they admit that they have suffered no loss or damage as a result of the alleged installation of MK-3 in the Building. In fact, Polaris Western ceased to exist in 1983, and it was only restored to the register some time after this action was commenced, in order to be "represented in this case".

227 After Lordina re-conveyed its 50% interest to its parent company, Lord Realty, on December 30, 1977, it was allowed to expire. It, too, was only restored to the register after the commencement of this action.

228 In my view, the issues which arise out of these facts, at least so far as the plaintiffs' claims in tort are concerned, have been rendered academic by the Supreme Court of Canada's decision in *Winnipeg Condominium*, *supra*. Those who take part in the design and construction of a building owe a duty in tort to subsequent purchasers of the building to take reasonable care in its construction.

229 As I stated above, I am of the view that a similar duty of care is owed to subsequent purchasers of a building by one who manufactures and distributes a product, knowing that it will be incorporated into a building. Thus, upon proof of

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negligence, misrepresentation, or breach of a duty to warn, coupled with proof that the presence of MK-3 in the Building constitutes a "real and substantial danger" to the inhabitants of the Building, the present owners of the Building would be entitled to succeed on their claims in tort.

230 The plaintiffs admit that Lordina, Polaris Western and Polaris Canada have suffered no loss. Accordingly, whatever the outcome, they would be not be entitled to recover damages.

231 In light of the conclusion that I have reached regarding the fundamental issue of "real and substantial danger", it is not necessary for me to consider further the "interesting and complex" issues that arise out of the history of ownership.

### VIII. Release and Assignment

232 The next issue I will turn to is what I will call the "Release and Assignment" defence.

#### *Introduction*

233 In 1977, as the Project neared completion, a number of disputes arose between Foundation and the Building owners, then Lordina and Privest. These disputes related to the final calculation of the cost of the work, what constituted "work" under the contract, retail sales tax and rebates thereof, and a delay claim made against Foundation by the owners. The owners claimed approximately \$400,000 from Foundation, and Foundation claimed approximately \$200,000 from the owners.

234 At the same time, several sub-contractors were pressing Foundation for payment of the amounts owing to them. There was then approximately \$4 million owing to sub-contractors and suppliers, and they were demanding the release of holdback monies prior to the resolution of the disputes. The owners proposed that the sub-contractors be paid without prejudice to Foundation's claims. However, because it wanted to ensure that it did not subsequently become involved in disputes between the owners and the sub-contractors, Foundation would only agree to do that if the owners would release the sub-contractors from all claims they might have against them. The owners refused to do so.

235 In September 1977, Lordina and Privest commenced an action against Foundation for damages and an accounting. Thereupon, Foundation took the position that it would not countersign cheques to the sub-contractors for the balance of their holdback monies unless the owners agreed to an unconditional release of all damage claims. Lordina and Privest were not prepared to do that.

236 The disputes were finally resolved, and on November 10, 1977, a Settlement Agreement was executed by Foundation, as Contractor, and by Lordina and Privest as the "Owner". The recital clauses in that agreement read as follows:

WHEREAS the owner is the owner of a building known as the Harbour Centre, erected by the Contractor in the City of Vancouver in the Province of British Columbia, pursuant to a certain construction contract made August 1st, 1974 together with the revisions thereto (collectively the "Construction Contract") at and for a guaranteed maximum cost of work.

AND WHEREAS a dispute has arisen between the parties with respect to a claim for Federal Sales Tax rebate and with respect to damages as a result of certain allegations by the owner;

AND WHEREAS the owner has commenced an action in the Supreme Court of British Columbia by action number C775161, Vancouver Registry, claiming inter alia, a certain sum of Federal Sales Tax rebate and damages;

AND WHEREAS there is in existence a trust account under the control of the owner and the contractor in order to secure the funds necessary to pay the outstanding amount of work.

237 The Settlement Agreement further provides that, in consideration of the mutual covenants, agreements, warranties and payments therein contained, the parties, for themselves and on behalf of their respective successors and assigns, agree that:

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238 a) \$97,711 would be paid by Foundation to the Owners in respect of the Federal Sales Tax rebate, together with the further sum of \$102,000 for damages;

239 b) various payments would be made to Lordina and Privest and to Foundation from a trust account; and

240 c) Lordina and Privest would discontinue the Action against Foundation.

241 Clause 5 of the Settlement Agreement (the "Release") provides:

That in consideration of the payment to the Contractor as herein before set out and in consideration of the Agreement between the parties with respect to the matters in issue between them, the parties hereto release and forever discharge each other, their respective successors and assigns, of and from all, and all manner of action and actions, cause and causes of action, suits, debts, sums of money, accounts, reckonings, covenants, contracts, controversies [sic], agreements, promises, damages, claims and demands whatsoever, in law or in equity which each may have against the other from the beginning of the Construction Contract to the date of these presents, except that the Construction Contract between the parties shall remain in full force and effect with respect to the provisions relating to:

a) General Condition 17, Indemnification;

b) General Condition 22, Mechanics Liens;

c) General Condition 34, Warranty;

d) the Contractor's obligation to fix or complete deficiencies

and the within release shall not be applicable to any claims which may arise with respect to the aforesaid four matters.

242 A Certificate of Total Completion, issued in May 1979, pursuant to General Condition 23 of the contract, discharged Foundation's obligations with respect to the four excluded items.

243 Clause 6 of the Settlement Agreement (the "Assignment") provides that:

That the Owner assign, transfer and set over to the Contractor and does hereby assign, transfer and set over to the Contractor any and all rights, claims and demands whatsoever, in law and equity that it may have against the Contractor's sub-contractors, arising out of the construction-erection contract and addendums thereto.

244 Foundation, Grace and Donalco submit that by reason of the Release and Assignment, the plaintiffs have no standing to bring this action against them.

#### ***The Release***

245 All of the provisions of the General Contract, except those relating to the four excluded items, were discharged by the November 10, 1977 Settlement Agreement. That Agreement, therefore, evidences a novation involving accord and satisfaction of Foundation's obligations to the owners under the General Contract. The accord is the agreement by which the obligations are discharged and the satisfaction is the consideration which makes the Agreement operative: *British Russian Gazette & Trade Outlook Ltd. v. Associated Newspapers Ltd.*; *Talbot v. Associated Newspapers Ltd.*, [1933] 2 K.B. 616 (C.A.), at p. 643.

246 The plaintiffs argue that the language of the Release does not contemplate a general release, but relates only to disputes which had arisen between the parties *at that time*. In this respect, they place great emphasis on the phrase "with respect to the issues between them" found in cl. 5. Further, they say that even if the Release is read broadly, it cannot be said

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to apply to their claims in this case because the damages alleged in this action were not reasonably within the contemplation of the parties at the time the Settlement Agreement was signed. They argue that the Release is valid only with respect to those matters which were, or ought reasonably to have been, within the contemplation of the parties when the Settlement Agreement was entered into.

247 In support of that argument, they cite the following comments of Lord Westbury in *London & South Western Railway Co. (Directors, etc.) v. Blackmore* (1870), 39 L.J. Ch. 713 (H.L.), at p. 720:

The general words in a release are limited always to that thing, or those things, which were in the contemplation of the parties at the time when the release was given. But a dispute that had not emerged, or a question which had not at all arisen, cannot be considered as bound and concluded by the anticipatory words of a general release.

248 Accordingly, the plaintiffs say, because the plaintiffs had no knowledge that Foundation had chosen and installed an asbestos-containing fireproofing material in the Building, they could not possibly have had in their contemplation the release of these asbestos-related claims.

249 I reject that submission. I do not believe that it must be shown that the plaintiffs were directing their minds to the specific subject of asbestos-containing fireproofing when the Release was executed.

250 Finally, for the reasons I have stated elsewhere, I have concluded that the plaintiffs were well aware of the controversy surrounding the use of asbestos-containing building materials, and that they knew or, on reasonable inquiry, would have learned that MK-3 contained asbestos. Thus, potentially at least, the plaintiffs could have released any further claims arising from this fact.

251 Whether or not they did so depends upon the proper construction of the Release clause. What must be determined is whether cl. 5 is drafted in such a manner as to indicate that the parties intended to release, apart from the excepted sections, all other potential future claims.

252 In *White v. Central Trust Co.* (1984), 54 N.B.R. (2d) 293 (C.A.), where, at p. 310, La Forest J.A. (as he then was) made the following observations about release clauses and their construction:

Before entering into an examination of the particular releases involved in this case and the circumstances under which they were executed, it may be useful to make some general remarks regarding the manner in which releases are to be construed. Like other written documents, one must seek the meaning of a release from the words used by the parties. Though the context in which it was executed may be useful in interpreting the words, it must be remembered that the words used govern. As in other cases, too, the document must be read as a whole. This is particularly important to bear in mind in construing releases, the operative parts of which are often written in the broadest of terms. Thus reference is frequently made to recitals to determine the specific matters upon which the parties have obviously focused to confine the operation of general words.

Then, after quoting Lord Westbury in *Blackmore*, he continues at p. 311:

What the statement quoted means is that in determining what was contemplated by the parties, the words used in a document need not be looked at in a vacuum. The specific context in which a document was executed may well assist in understanding the words used. It is perfectly proper, and indeed may be necessary, to look at the surrounding circumstances in order to ascertain what the parties were really contracting about.

253 Looking at the circumstances in which the Settlement Agreement was executed, one knows from the recital clauses (and I have had the benefit of testimony as well) that various disputes had arisen between the Owners and Foundation, and that the contract was, at a minimum, designed to resolve these matters. The plaintiffs argue that this is all that the Settlement Agreement and the included Release were intended to do. They say that the amounts in dispute were modest (relative to the size of the General Contract), and that the Owners would not have released all future recourse against Foundation for claims such as the present ones.

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254 Foundation, supported by the other defendants, disagrees. They maintain that, given the scope of the disputes at the time, it would have done Foundation little good to bring them to an end by a release of claims under the General Contract only to subsequently be sued in tort. They argue that a general release of all claims, present and future, formed part of the consideration for Foundation agreeing to pay the disputed sums to the Owners.

255 In my opinion, the words themselves provide the clearest indication of the intention of the parties.

256 The plaintiffs argue that the words "with respect to *the matters*" in the opening of the clause suggests an intent to limit the Release. But, in my view, that phrase functions as a reference to the consideration between the parties, rather than as a limit on the words which follow. This interpretation is supported by the placement of the comma, which follows the word "them", rather than "parties".

257 Foundation submits that the very wording of cl. 5 demonstrates that it was intended to cover more than the immediate issues in dispute. They submit that:

258 (a) the language of the operative part of the clause, which reads as follows:

... the parties hereto release and forever discharge each other, their respective successors and assigns, *of and from all, and all manner of* action and actions, cause and causes of action, suits, debts, sums of money, accounts, reckonings, covenants, contracts, controversies [sic], agreements, promises, damages, claims and demands *whatsoever*, in law or in equity which each may have against the other ... (emphasis added)

discloses an intention to discharge one another from any unknown actions or claims at the time. They say that it is not a release limited to specific claims. Rather, it is a general release of all manner of claims whatsoever in law or equity;

259 (b) in order to express their intention that the Release be exhaustive, the parties engaged in superfluity; i.e., they did not simply discharge contracts, they discharged reckonings, covenants, contracts, agreements and promises. Further, lest there be any doubt that any right to bring legal proceedings would survive, the Release refers to items in the singular and the plural, i.e., "all manner of action and *actions*, cause and *causes* of action"; and

260 (c) the Release is not in respect of any particular dispute or claim but is intended to apply to any possible claim having arisen *over a period of time*, i.e., any claim "which each may have against the other from the beginning of the Construction Contract to the date of these presents".

261 I agree with those submissions.

262 An alternative argument advanced by the plaintiffs is that the matters giving rise to their action against Foundation preceded, and are therefore independent of, the General Contract. They say that by January 1975, when the General Contract was actually signed, Foundation had already reviewed the original specifications, noted the difference between the spray fireproofing specification drawn by Paine & Associates for the Tower portion and that prepared by Eng & Wright for the Retail Section (including the Building), and had, nonetheless, allowed asbestos-containing MK-3 to be sprayed on the underside of two floors of the Building without warning the owners of the dangers inherent therewith. They cite BG Checo International Ltd. v. British Columbia Hydro & Power Authority, [1993] 1 S.C.R. 12 at 30 [75 B.C.L.R. (2d) 145, [1993] 2 W.W.R. 321], as authority for the proposition that:

... a contractual limitation may not apply where the tort is independent of the contract in the sense of falling outside the scope of the contract ...

263 They say that because the breach of a duty to take care and the failure to warn pre-dated the General Contract, and both the General Contract and the Settlement Agreement were entered into without knowledge of those facts, it cannot be said that Foundation's tort duties are concurrent with its obligations under the General Contract.



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264 Again, given my finding concerning the extent of the plaintiffs' actual or deemed knowledge, I find this argument to be without merit.

265 For all of these reasons, I have concluded that the Release is broad enough to preclude recovery in this action.

### *The Assignment*

266 Clause 6 of the Agreement was the result of a compromise. Originally, as I noted above, Foundation wanted the owners to release any claims they might have against the sub-contractors prior to the payment of the holdback monies. The owners refused to do that, and instead assigned to Foundation any claims that they might have against the sub-contractors. Thus, Foundation would be able to raise those claims in defence of any actions brought against them by the sub-contractors.

267 Foundation, again supported by the other defendants, argues that because the owner assigned to it any claims that "it may have against the Contractor's sub-contractors", the plaintiffs have no standing to sue Donalco or Grace Canada, both of whom by definition are "sub-contractors".

268 The plaintiffs advance three arguments in support of their assertion that the Assignment does not preclude their action against Grace Canada and Donalco. The first two arguments are similar to the arguments advanced with respect to the effect of the Release clause; namely, that the Assignment does not contemplate the type of claim advanced in this action, and that the liability of those defendants is independent of the General Contract.

269 For the reasons discussed above under the heading, "The Release", I reject those submissions.

270 The plaintiffs' final argument relates only to the Grace defendants. They argue that although cl. 6 of the Agreement assigns to Foundation all actions against "sub-contractors", it does not affect the plaintiffs' claims against the Grace defendants because Grace Canada was not a sub-contractor.

271 The General Contract defines the terms "Sub-contractor" and "Materialman" as follows:

"Sub-contractor" means a person, firm or corporation having a direct contract with the Contractor (or a person, firm or corporation having such a direct contract with such a Sub-contractor) to perform a part or parts of the Work or to supply material work to a special design according to the Contract Documents, but does not include a Materialman.

"Materialman" means a person engaged by the Contractor to supply materials to the project.

272 Grace Canada submits that it was a "sub-contractor" within the definition of that word and thus is entitled to the protection afforded by the assignment of claims contained in the Settlement Agreement. Grace Canada's argument proceeds along these lines:

(1) Since it was not "engaged by the Contractor to supply materials to the project", it was not a Materialman;

(2) However, it did have "direct contract" with Donalco, a sub-contractor that did perform part of the work on the Project;

(3) Grace Canada did supply material "work to a special design according to the Contract Documents" in that paragraph 109 of the General Contract defines "Construction Documents" to mean:

This Agreement, the General Conditions, and Supplementary General Conditions executed by the parties, the Sketch Plans and Specifications, ... Incomplete Working Drawings and Specifications, Final Working Drawings and Specifications ...

and

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(4) Grace Canada's products were specified by trade name in the Original Specifications, the Outline Specification and in the Final Specification; those Specifications required that the fireproofing material be applied in accordance with the manufacturers' instructions and sprayed to certain thicknesses on particular surfaces in the building in order to achieve the appropriate fire-rating protection approved by the City of Vancouver.

273 Grace Canada also argues that it performed "a part or part of the Work" within the meaning of the General Contract, which, in para. 2.01, states that:

The owner engages the Contractor to commence, carry out and complete improvements to the Lands and Premises of the following nature:

(a) the further renovation of the Existing Building to accommodate a Sears Department Store and to add two floors to and to modify the Parking Garage and to construct all of that part of a new building on the Lands and Premises other than the part thereof set out in subparagraph (b) hereof, and to install all the services for the foregoing (hereinafter separately referred to as the "First Phase"); and

(b) to construct that part of the new building to be built on the Lands and Premises above elevation 241.16 feet shown on the Sketch Plans comprising an office tower, restaurant and public observation level together with all those parts of the balance of the new building below such office tower to be used in connection with the foregoing (hereinafter separately referred to as the "Second Phase")

to the extent and within the scope set out in the Contract Documents, which is hereinafter referred to as the "Work"

...

274 Grace says that, at the request of the architects, it provided information to the City of Vancouver regarding design J701 and its product MK-3 and also provided specified products to the Project.

275 Grace also asserts that the clear purpose of the Settlement Agreement was to resolve any disputes or claims that might arise and, from Foundation's point of view, to forestall the possibility of becoming involved in litigation between the owners and sub-contractors after the holdback monies had been paid. They say that the present action actually exemplifies the state of affairs which the parties intended to avoid, as Foundation appears in this action both as a defendant and as a third party.

276 Grace submits that to read para. 6 of the Settlement Agreement narrowly, so as to exclude them from its effect, would be inconsistent with the obvious purpose and tenor of the Agreement, which was to assign to Foundation all causes of action arising out of the Project so that Foundation, and Foundation alone, would be able to commence proceedings based on such causes of action. In return, they say, the owners received substantial consideration, including the resolution of a major dispute with Foundation.

277 In law, an assignment of a chose in action is lawful and enforceable where the assignee has a genuine or legitimate commercial interest in the claim of another: *Trendtex Trading Corp. v. Credit Suisse*, [1981] 3 All E.R. 520 (H.L.); *Fredrickson v. Insurance Corp. of British Columbia* (1986), 28 D.L.R. (4th) 414 [3 B.C.L.R. (2d) 145, [1986] 4 W.W.R. 504] (B.C.C.A.), affirmed (1988), 49 D.L.R. (4th) 160 [[1988] 6 W.W.R. 633] (S.C.C.).

278 Foundation clearly had a genuine commercial interest in resolving any present and future litigation relating to the Project, including any claims brought by Lordina and Privest against other participants in the construction of the Project which could result in the joinder of claims against Foundation.

279 In somewhat analogous circumstances, an assignment of a claim was found to be valid: *Brownston Ltd. v. Edward Moore Incubon Ltd.*, [1985] 3 All E.R. 499 (C.A.). There, the plaintiff had sued two parties, a computer consultant and a computer manufacturer, over defects in a computer system. The defendants claimed contribution from each other. After settling with one defendant, the plaintiff assigned to it all causes of action it had against the other defendant. The Court of Appeal upheld the validity of the assignment on the basis that the first defendant had a sufficient "genuine commercial

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interest" or "genuine and substantial interest" in the totality of the transaction which was the subject of the assignment. One factor specifically mentioned as a reason to uphold the assignment was that it arose out of an effort to settle the dispute or reduce the number of parties involved in the litigation.

280 For the reasons I have stated elsewhere, I have concluded that the plaintiffs were well aware of the controversy surrounding the use of asbestos-containing building materials, and that they knew or, on reasonable inquiry would have learned, that MK-3 contained asbestos. Therefore, in my view, the alleged use of a defective building material was within the reasonable contemplation of the parties when they signed the Settlement Agreement.

281 However, neither of the Grace defendants entered into a contractual relationship with the Contractor. Neither of them performed "work" on the construction site nor, in my view, can it be said that MK-3 was "material work to a special design according to the Contract Documents". Clearly, neither of them falls within the definition of "Materialman". Grace Canada's relationship with the Project arose through a sales contract with Donalco.

282 But, as I have said, I am satisfied that Foundation had good commercial reasons for not wanting to release the holdback monies and settle the disputes with the owners without first, or at the same time, protecting itself from becoming embroiled in litigation between the owners and sub-contractors in the future. The assignment of all claims that the owners might have against the sub-trades was intended to prevent that possibility.

### ***Conclusion***

283 I have concluded that, in the circumstances of this case, it makes good sense to treat Grace Canada as a sub-contractor. Even though it was not a "Materialman" within the definition contained in the General Contract, it did supply materials to the Project and thus, as this action well demonstrates, could become involved in litigation with the owners and in third party proceedings against Foundation.

284 Because I am unable to find that the material supplied by Grace was "work to a special design", my conclusion that Grace is, for the purposes of the assignment, a "Sub-contractor" is based on what may perhaps be best characterized as "policy" considerations. In my opinion, it would make no sense from Foundation's point of view to obtain an assignment of the owners' claims against sub-trades who performed work, but not against those who supplied materials to those sub-trades. The possibility that claims might be made by such suppliers was clearly foreseeable.

285 I find that by the terms of the Settlement Agreement, the then owners of the Building, Lordina and Privest, assigned to Foundation any and all claims that they might have had against the defendants, Donalco and Grace Canada. Accordingly, the plaintiffs have no standing to pursue the claims made against those defendants. It follows that, quite apart from the other arguments that have been raised, the plaintiffs' claims against Grace-Conn. must also fail.

## **IX. Product Liability**

### ***Introduction***

286 Notwithstanding the conclusions I have reached with respect to the Limitation and Release and Assignment defences, I intend to consider the issues arising from the plaintiffs' allegation that Monokote MK-3 was an inherently dangerous product that has contaminated the Building by continually releasing asbestos fibres into its atmosphere, thus causing physical damage to the plaintiffs' property and endangering the health of workers and occupants.

287 But, before discussing those issues, I think it may be helpful if I review, albeit in a general way, the law as it stands in Canada today with respect to the liability of the manufacturer of a defective product.

### ***General Principles***

288 The classic statement of the duty of care owed by the manufacturer of a product to its ultimate consumer or user was made by Lord Atkin in the course of his speech in *M'Alister (Donoghue) v. Stevenson*, [1932] A.C. 562 (H.L.). There, at p.

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599, he said:

... a manufacturer of products, which he sells in such a form as to show that he intends them to reach the ultimate consumer in the form in which they left him with no reasonable possibility of intermediate examination, and with the knowledge that the absence of reasonable care in the preparation or putting up of the products will result in an injury to the consumer's life or property, owes a duty to the consumer to take that reasonable care.

289 Nearly forty years further on, that guiding principle was restated by the Supreme Court of Canada in *Lambert v. Lastoplex Chemicals Co.*, [1972] S.C.R. 569, in these words (at p. 574):

Manufacturers owe a duty to consumers of their products to see that there are no defects in manufacture which are likely to give rise to injury in the ordinary course of use. Their duty does not, however, end if the product, although suitable for the purpose for which it is manufactured and marketed, is at the same time dangerous to use; and if they are aware of its dangerous character they cannot, without more, pass the risk of injury to the consumer.

290 And, fifteen years after that, the Ontario Court of Appeal said the following about Lord Atkin's classic formulation of the law (*Buchan v. Ortho Pharmaceutical (Canada) Ltd.* (1986), 54 O.R. (2d) 92 (C.A.), at p. 101):

This statement has been the source of subsequent developments in products liability law based on negligence. The *rationale* is that one who brings himself into a relation with others through an activity which foreseeably exposes them to danger if proper care is not observed must exercise reasonable care to safeguard them from that danger. It can now be taken as a legal truism that the duty of reasonable care which lies at the foundation of the law of negligence commonly comprehends a duty to warn of danger, the breach of which will, when it is the cause of injury, give rise to liability: see, generally, Fleming, *The Law of Torts*, 6th ed. (1983), at p. 459 ff., and Linden, *Canadian Tort Law*, 3rd ed. (1982), at p. 563 ff.

Once a duty to warn is recognized, it is manifest that the warning must be adequate. It should be communicated clearly and understandably in a manner calculated to inform the user of the nature of the risk and the extent of the danger; it should be in terms commensurate with the gravity of the potential hazard, and it should not be neutralized or negated by collateral efforts on the part of the manufacturer. The nature and extent of any given warning will depend on what is reasonable having regard to all the facts and circumstances relevant to the product in question.

291 With respect to a manufacturer's duty to warn potential consumers of dangers associated with the use of his product, it has been held that (*Nicholson v. John Deere Ltd.* (1986), 34 D.L.R. (4th) 542 at 549 (appeal dismissed [(1989), 57 D.L.R. (4th) 639 (C.A.)]):

Standing at the forefront of the discussion, in this case of a duty to warn, is the fact that the manufacturer put out a product which he knew was dangerous. Given this knowledge of the risk inhering [sic] in the ordinary use by a reasonably prudent consumer, when other more reasonable alternatives are available, there is first a duty not to manufacture in the intended defective way. It is only when a manufacturer is given the benefit of a doubt on the first question that the duty to warn may come into play. This has already been said.

A manufacturer does not have the right to manufacture an inherently dangerous article when a method exists of manufacturing the same article without risk of harm. No amount of or degree of specificity of warning will exonerate him from liability if he does.

292 What is meant by the words "defect" or "danger" in this context was considered by Stratton J. of the Alberta Court of Queen's Bench in *Holt v. P.P.G. Industries Canada Ltd.* (1983), 25 C.C.L.T. 253 at 264. There he noted that:

... it seems increasingly clear that the trend in Canadian/English Courts is to allow an inference of negligence to be more readily drawn particularly as against a manufacturer. This inference, however, comes into prominence only in the event that the product in question is found to be defective ...

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The test to be applied to determine whether any defect exists was dealt with at p. 13 of the Ontario Law Reform Commission Report on Products Liability (op. cit.). After referring to Lord Atkin's test in *M'Alister (Donoghue) v. Stevenson*, supra, the report continued as follows:

For there to be liability under Lord Atkin's statement, it is clear that a product must fall short in some way of what it ought to be; a product, in other words, must be defective. Some test of the concept of 'defect', therefore, is required. This must be a general and flexible test; and, it would seem that the concept cannot be defined except in terms of *what it was reasonable to expect of the product in all the circumstances*.

[Emphasis in original.]

#### *Compliance with Statutory Requirements*

293 The case of *Saskatchewan Wheat Pool v. Canada*, [1983] 1 S.C.R. 205 [[1983] 3 W.W.R. 97], stands for the proposition that proof of a statutory breach constitutes some evidence of negligence. The other side of the coin is that evidence of compliance with a statutory or regulatory requirement or standard is some evidence of conformity with the common law standard of care.

294 In the most recent edition of his text, *Products Liability*, Professor Waddams put it this way at p. 124:

Whether or not the supplier has complied with statutory requirements is a relevant factor in considering whether the product is defective, or the supplier's conduct reasonable, but it should not be conclusive.

295 In *Franklin v. Gramophone Co.*, [1948] 1 All E.R. 353, the English Court of Appeal held that compliance or non-compliance with statutory regulations is relevant to the issue of negligence. The Court observed (at p. 360) that:

... in very many cases, it would be difficult, if not impossible, to maintain that an employer who had complied with regulations had been negligent at common law.

296 That conclusion has been accepted by this court: *Gies v. Gunwall* (1982), 143 D.L.R. (3d) 126 at 131.

297 A similar conclusion was reached by the United States Court of Appeals, Fifth Circuit, in *Gideon v. Johns-Manville Sales Corp.*, 761 F. 2d 1129 (1985). That case involved a claim for personal injury brought by an asbestos worker. The Court found that the defendant had complied with the standards prescribed by the Occupational Safety and Health Administration ("OSHA") and stated (at p. 1144) that:

Compliance with such government safety standards constitutes strong and substantial evidence that a product is not defective.

298 A decision of the Ontario High Court of Justice (General Division) illustrates a similar approach. In *ViSP Construction v. Scepter Manufacturing Co.* (1991), 45 C.L.R. 170, the Court dealt with an action in tort brought by a contractor against a manufacturer of pipe that had been bought from a third party. The defendant led evidence which established, to the Court's satisfaction, that its manufacturing processes complied with specifications set by the Canadian Standards Association. The Court concluded that the CSA standard was a reasonable one to adopt, and that the defendant took reasonable precautions to assure that its product met that standard.

299 In his reasons for judgment, Mr. Justice Anderson observed, at p. 183, that:

The contention of the plaintiff is that there is liability on the defendant for any defective pipe which it manufactures and which comes into the hands of an end user. As I have already intimated, that could be so only if there were a manufacturer's warranty of quality, or if the law imposed strict liability. It is no doubt because faulty or defective merchandise is manufactured from time to time that manufacturer's warranties are sought and offered of and from

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certain manufacturers. Such warranties are issued in carefully considered contractual terms.

300 Nonetheless, it must be noted that a manufacturer has a duty to make reasonable efforts to reduce any risk to life and limb that may be inherent in the design of his product: *Rentway Canada Ltd./Ltée v. Laidlaw Transport Ltd.* (1989), 49 C.C.L.T. 150 at 158 (Ont. H.C.).

### ***Strict Liability***

301 In product liability cases, Canadian courts have always insisted upon some degree of fault. Unlike the courts of many of the American states, they have, thus far at least, rejected the doctrine of strict liability. A clear statement of the Canadian position is found in *Phillips v. Ford Motor Co.*, [1971] 2 O.R. 637, where, at p. 653, the Ontario Court of Appeal said:

While the scope of *M'Alister (or Donoghue) v. Stevenson*, [1932] A.C. 562, has been greatly extended and is no longer limited to articles of food and drink ... our Courts do not, in product liability cases, impose upon manufacturers, distributors or repairers, as is done in some of the States of the American union, what is virtually strict liability. The standard of care exacted of them under our law is the duty to use reasonable care in the circumstances and nothing more.

302 That statement of law reflects the current position in British Columbia: see *Meisel v. Tolko Industries Ltd.*, unreported (January 18, 1991), Vancouver Reg. C876168 (B.C.S.C.), and *Stiles v. Beckett*, unreported (January 4, 1993), Vancouver Reg. C893010 (B.C.S.C.) [reported 22 C.P.C. (3d) 145].

303 The plaintiffs have "invited" this Court to apply the concept of strict liability with respect to their claims against the Grace defendants. The Grace defendants have responded to that suggestion with strong arguments as to why a shift toward strict liability would not be appropriate.

304 In a paper entitled "Products Liability", given at the Paisley Conference on the Law of Negligence in September 1990, and found in *Donoghue v. Stevenson and the Modern Law of Negligence: The Paisley Papers* (published by The Continuing Legal Education Society of British Columbia), Professor John G. Fleming describes the "transformation" from fault-based to strict liability that took place in the American law of products liability during the 1960s. Since then, he says, the concept of strict liability has "dominated" the field of products liability in the United States. And, after noting that a similar change was taking place in several European countries, he wonders, "How much longer can Canada afford to stand aside?"

305 But, I find it significant that in the same paper, Professor Fleming also observes (at p. 126) that:

The spectacular increase in products liability litigation of the past twenty years is almost exclusively attributable to design defect and failure to warn cases. It is thus a paradox that the switch to strict liability, which was originally hailed as likely to reduce litigation, has actually produced the exact opposite effect.

306 Later in that paper, Professor Fleming writes of the "retreat" by the American courts from the concept of strict liability to that of negligence, and said that [p. 135]:

This "quiet revolution" can be seen both in the tenor of appellate judicial opinions and in the trends in litigation. [Footnote omitted.]

307 "Also indicative," he writes, "of the retreat from stricter versions of liability has been the treatment of the time dimension and the so-called 'state of the art' defence" [p. 131].

308 Professor Fleming also observes that, despite the claims of some that the law "has strayed too far from traditional notions of tort into no-fault compensation", for a personal injury to be compensable under the strict liability approach, "it must have been caused not just by a product, but by a *defective* product" (emphasis in the original) [p. 123].

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309 The Canadian law is well settled and, if consideration is to be given to the adoption of a strict liability concept in product liability cases, that is something that must be left to the appellate courts.

#### X. The Admissibility of Learned Treatises

310 Another matter I wish to discuss before approaching the central issues in this case is a ruling I made during the trial concerning the use of "learned treatises" on the subject of asbestos and asbestos-related diseases.

311 The treatises or papers in question were authored by "experts" who did not testify before this court; they had been referred to by Mr. Roberts during his cross-examinations of Grace's expert witnesses with a view to challenging the validity of the opinions those witnesses had expressed. Mr. Roberts later argued that those treatises should be admitted into evidence, not only for that purpose, but also for the truth of their contents. In other words, he took the position that the plaintiffs should be entitled to rely on the findings and opinions given in those treatises to support their claims.

312 I rejected Mr. Roberts' argument and gave reasons at the time. However, I think it will be helpful if I repeat that ruling in this judgment, not only because of its potential application in other cases but, more importantly, because of the significant impact it had on the strength of the plaintiffs' case.

313 What follows is a mildly edited version of the text of my ruling.

I will turn then, counsel, to the outstanding matter of the admissibility of the expert or learned treatises put to certain of the expert witnesses called by the Grace defendants. This ruling relates to the admissibility into evidence of certain documents, some being papers commonly described as learned treatises, others not usually thought of in those terms, such as letters written by persons known or suggested to be experts in various fields. The documents were assembled by counsel for the plaintiffs for the purposes of cross-examination of various of the expert witnesses called by the Grace defendants, and they form part of the collections of documents assembled in loose-leaf binders.

A statement of the generally accepted view as to the use that may be made of such material is found in J. Sopinka, S.N. Lederman and A.W. Bryant, *The Law of Evidence in Canada*, 2nd ed. (Toronto: Butterworths, 1992). Under the heading, 'Use of Authoritative Literature', the authors state (at p. 560):

Peculiar to the examination of experts is the utilization of textbooks. In support of any theory, an expert is permitted to refer to authoritative treatises and the like, and any portion of such texts upon which the witness relies is admissible into evidence. Moreover, it appears that, if a written work forms the basis of the expert's opinion, then counsel is allowed to read extracts to the expert and obtain his or her judgment on them. The written view of the author thereby becomes the opinion of the witness. If the witness does not adopt the writing as being authoritative and in accord with the witness' own opinion, nothing may be read from the text, for that would be tolerating the admissibility of pure hearsay. [citations omitted]

The authors refer to the decision of Chief Justice Harvey and Mr. Justice Beck in the oft-cited *R. v. Anderson* (1914), 5 W.W.R. 1052 (Alta. C.A.), and then continue (at p. 561):

Learned treatises may be used in a similar way in cross-examination of the expert to confront him with an authoritative opinion which contradicts the view expressed by the witness on the stand ...

By so doing, the treatise is not used for the hearsay purpose of proving the truth of the opinion contained therein, but as a means of testing the value of the expert witness' conclusion. It becomes not positive evidence, but as in the case of the cross-examining tool of prior inconsistent statements, it is utilized to challenge the expert's credibility; to test whether the witness has intelligently and competently read and applied what has been authoritatively written on the subject. If the witness adopts a passage in the text, it is the expert and not the text writer's opinion that is admitted into evidence. [citations omitted]

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However, as the learned authors note, some American courts have chosen not to limit the evidentiary value of texts to an impeachment purpose on cross-examination, or to a demonstration of the basis of the expert's conclusion when examined in chief. Under certain of the American *Rules of Evidence*, learned treatises are recognized as an exception to the hearsay rule and received as substantive evidence in their own right. As the authors state (at p. 562):

Wigmore favoured this exception to the hearsay rule on the basis that the absence of cross-examination of the author of the treatise created no prejudice since the author would obviously possess no bias in the particular case and because there would be a strong motivation on his or her part to state the position accurately since the author would be aware that his or her writings would be subject to the scrutiny and criticism of other experts in the field.

The conventional rule in Canada, however, is that writings put to an expert witness in cross-examination are, providing the witness recognizes the author of the writing or the text in which it appears as authoritative, admissible to test the credibility of the opinion of that expert. If the expert witness accepts the opinion expressed in writing, as the authors pointed out, he or she adopts it and it becomes part of his own testimony. If he or she does not accept it, the textual opinion is not admissible as substantive evidence in the trial. In that event it is the fact that the author or the text from which the writing was taken, recognized as authoritative by the witness, contradicts the opinion of the testifying expert, which is admissible, and not the substance of the contradictory opinion.

I pause here to note that in cross-examination it is important to consider whether the testifying expert must recognize the authority of the text or journal from which the writing is extracted or merely the authority of the writer or the author before the textual opinion may be put to him. Some argument was addressed to this point.

There are cases that support either conclusion, and it seems to me that it becomes a question of fact in each instance. Does the witness recognize the authority of -- as distinct from accepting the validity of -- the particular writing, either due to the status of the text or journal from which the writing is taken or due to his or her recognition of the status and authority of the author?

In any event, it is apparent that the traditional rule does little damage to the hearsay rule. No textual opinion offered in chief or in cross-examination is admissible in itself unless an expert witness adopts it as his own.

I do not propose today to embark upon a detailed analysis of the interesting and forceful argument advanced by Mr. Roberts. It will suffice if I say that he advocates the adoption of what I will refer to as the 'Wigmore approach', as it was adopted by McEachern C.J.S.C. (as he then was) in *Delgamuukw v. British Columbia* (1991), 79 D.L.R. (4th) 185 [1991] 3 W.W.R. 97 (B.C.S.C.), to those writings found in the binders that I referred to earlier, and assembled for the cross-examination of several of the Grace defendants' expert witnesses.

Onto the 'Wigmore' view, Mr. Roberts has grafted the decisions of the Supreme Court of Canada in *R. v. Khan*, [1990] 2 S.C.R. 531, and *R. v. Smith*, [1992] 2 S.C.R. 915, both well-known decisions dealing with the admissibility of testimonial hearsay. He maintains that there is in this case that degree of circumstantial probability of trustworthiness and of necessity which warrants the admissibility and use of those writings as substantive evidence of the findings and opinions expressed therein.

I do not agree. I am not persuaded that the circumstances of this case justify such an approach. In *Delgamuukw*, the writings in question related not only to scientific opinion, but also to the specific factual matrix of the case. In fact, the Chief Justice held that not only were the treatises in question admissible in evidence, but also that the facts they stated were to be treated as *prima facie* true, subject to a later determination as to the weight to be given to them. It would not be going too far, in my opinion, to say that in that case the Chief Justice was dealing with what, under the conventional rules of evidence would be an almost unmanageable situation, in that the experts were assessing history rather than science and they were, to a large extent, inter-reliant upon one another. There was, in *Delgamuukw*, what might be called a 'pressing necessity', in that the parties could not have been expected to prove by conventional means the facts that had gone into the formulation of many learned opinions. The Chief Justice



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acknowledged in *Delgamuukw* the need to be 'pragmatic'.

In *Khan* and *Smith* the Supreme Court of Canada held that reliable evidence should not be excluded simply because it cannot be tested by cross-examination, but I think it is significant that in those two cases the Court approved the use of testimonial hearsay to establish facts.

In a subsequent decision dealing with the use of prior inconsistent statements, *R. v. B. (K.G.)*, [1993] 1 S.C.R. 740, the Supreme Court of Canada, while reiterating the governing principles of reliability and necessity, noted that since the orthodox rule, which limits the use of prior inconsistent statements to impeaching the credibility of the witness, is an incarnation of the hearsay rule, a reformed rule must also deal with what they called the 'hearsay dangers' of admitting prior inconsistent statements for the truth of their contents -- namely, the absence of an oath or solemn affirmation when the statement was made, the inability of the trier of fact to assess the demeanour, and therefore the credibility of the declarant when the statement was made, and the lack of contemporaneous cross-examination by the opponent.

In my opinion, the assessment of reliability and trustworthiness of expert opinion evidence involves very different considerations from those required in the case of factual evidence. In the case of expert opinion evidence, the need for cross-examination is, if anything, greater than in factual situations, because the trier of fact is likely to be in a poor position to assess the credibility of a scientific opinion without the assistance of cross-examination by opposing counsel, or to adopt the felicitous phrase employed by the late Mr. Justice McColl in *Abermin Corp. v. Granges Exploration Ltd.* (10 August 1990), Vancouver Reg. C884398 (B.C.S.C.), without exposing the opinion '... to the vagaries of opposing counsel's inquiring minds' [p. 4].

In one sense, Mr. Roberts would have this Court go beyond the bounds of the *Delgamuukw* ruling. As I understand his submission, he would have the entire writing put to the witness admitted as substantive evidence, not just the portion to which his attention was directed. That is a step that Chief Justice McEachern was not prepared to take in the *Delgamuukw* case. Nor am I.

The conventional rule is well expressed in the reasons given by Mr. Justice Beck in *Anderson*, supra, with which all of the other judges, including Chief Justice Harvey, agreed. Quoting from the judgment of Mr. Justice Tuck in *Brownell v. Black* (1890), 31 N.B.R. 594 (C.A.), Mr. Justice Beck stated (at p. 1063):

I think an expert witness may be examined as to what is in the books. Medical works are produced which are recognized by the profession as standard authorities. An expert witness is being examined, who gives evidence as to specified diseases and their remedies. It is found by reference that his statements are at variance with what is laid down by the best authors on the same subject. Surely it must be right of counsel to confront the witness with books written by scientific men, leaders in their profession, for the purpose of showing either that the witness is mistaken, or that he may explain and reconcile, if he can, the real or apparent difference between what he has said and what is found in the books. If it was otherwise, men of insufficient learning, or veritable quacks, might palm off their crude opinions on juries as scientific knowledge. There is a marked difference between reading what is in a book as evidence to a jury, and testing a witness when examining him by reading to him from the same book. In the one case, you are reading as evidence what, after all, is only the opinion of a scholar, however learned he may be, without an opportunity to cross-examine him. In the latter, you are testing the opinion of one expert by the writings of another, admitted to be of high authority. It may be that the author's views are placed before the Jury as effectually in one way as in the other; but, in my opinion, one way is objectionable, and the other is not.

In *Brunsdon v. Shaw* (1992), 73 B.C.L.R. (2d) 313, our Court of Appeal recognized the continuing validity of the rule in *Anderson* and referred specifically to the reasons given by Mr. Justice Beck, as well as those expressed by Chief Justice Harvey. *Brunsdon*, in my opinion, confirms that in all but the most exceptional of cases, like *Delgamuukw*, the conventional rules will apply.

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My conclusion, therefore, is as follows: Our rules of evidence contain express provisions governing the admissibility of substantive opinion evidence and those rules should not, except in unique circumstances, be abrogated. Long and complex as this trial might be, learned and authoritative as the authors of the textual materials may be, the circumstances of necessity that were present in the *Delgamuukw* case do not exist here, and, in my view, the conventional rules must apply. Accordingly, it is my conclusion that no textual finding or opinion offered in chief or in cross-examination will be taken as substantive evidence unless an expert witness has accepted it and, in so doing, adopted it as his own.

314 The result of my ruling was that, so far as the alleged hazardous nature of MK-3 is concerned, the plaintiffs' case rested primarily on the testimony of one expert medical witness, whose opinion, for reasons which I will canvass in considerable detail in the following sections of this judgment, I did not find persuasive.

#### **XI. Asbestos and Asbestos-Related Diseases**

315

##### **Introduction**

316 The plaintiffs maintain that, as one authority on the subject has put it, "exposure to asbestos kills": (Matti Huuskonen, M.D., M.Sc., and Antti Tossavainen, D.Tech., "Fifty Year Experience in Diagnosing Asbestos-Related Cancers in Finland: Progress and Detours" (1992), 22 American Journal of International Medicine 259-61 at 259). To support that position they rely heavily on the fact that in its *National Emission Standards for Hazardous Air Pollutants, Asbestos, Beryllium and Mercury*, published April 6, 1973, the United States Environmental Protection Agency (the "EPA") stated that:

It is not practicable, at this time, to establish allowable numerical concentrations or mass emissions limits for asbestos.

*... low level and/or intermittent exposure to asbestos over a long time may be equally as important in the etiology of asbestotic disease as high level and/or continuous exposure over a shorter period ... (emphasis added)*

317 The plaintiffs allege that the Monokote MK-3 installed in the Building continually released asbestos fibres into its atmosphere, thereby posing a danger to the health of the workers and occupants of the Building and causing damage to property. They say that each of the defendants knew or ought to have known of the dangerous nature of MK-3 and its "potential to cause harm to others either in its application or continued use or existence in a building".

318 I will begin my discussion of these allegations by reviewing, in some detail, the evidence concerning the mineral asbestos and the diseases known to be associated with it. I will look at the matter of asbestos-related disease from two perspectives: first, in light of what was known at the time MK-3 was installed in the Building and, second, with the benefit of the further scientific knowledge that had been acquired by 1987, when the decision was made to remove all of the spray fireproofing material from the Building. It is my understanding that, so far as the matters in issue in this case are concerned, the state of knowledge today is much the same as it was in 1987.

319 But first, I think this is an appropriate time to deal with a point made in the plaintiffs' opening statement about this fundamental issue. There, under the heading, "Is Asbestos Harmful?", the plaintiffs began an outline of their case concerning the health hazards of asbestos by saying:

We now turn to the question of the health hazard of asbestos. We start by making it clear that it is not necessary given the pleadings in this case, to prove that the Monokote 3 in this building has caused or will cause an asbestos related disease.

Rather, we must show, and will show, that reasonably informed people, in the relevant period, would know that there was serious scientific and public concern, and that a significant number of credible authorities and individuals believed and are still of the view that asbestos containing materials, including Monokote 3, constitute a genuine and

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major threat to health.

320 Mr. Roberts suggested that Grace Canada has conceded the truth of those assertions by pleading, in para. 5B of its Further Amended Statement of Defence, that many persons and parties:

... were aware at all material times of concerns about the hazards of asbestos in certain circumstances, and that in certain circumstances asbestos could be hazardous to human health or workers' safety.

321 In his opening statement for the Grace defendants, Mr. Robinson responded to that submission by saying:

The Plaintiffs' Opening ... mischaracterises this action by dwelling at length upon the subject of asbestos hazards *simpliciter*. As is plain from the pleadings, the question of whether exposure to high levels of airborne asbestos fibres, over prolonged periods of time, constitutes a potential hazard to human health is not in issue. The central question that must be answered by this Court is a quite different one. Assuming without conceding that the Plaintiffs could prove that what they removed from their building was, in fact, Monokote MK-3 and that in-place Monokote MK-3 did release some asbestos fibres into the atmosphere, then the essential question is: have the Grace Defendants negligently breached some duty of care owed to the Plaintiffs? Before answering that question it will be necessary to determine whether exposure to airborne asbestos fibres in low concentrations was known in the medical literature to constitute an appreciable health hazard between 1973-1975 or, indeed, whether low-level exposure is considered by medical experts today to be a hazard to health.

322 And in Surrey, the Grace defendants restated their position in these words:

The point has been made many times over the course of this trial, and in our Argument, that conditions in industrial settings (like plants where asbestos-containing products, including MK-3, were made) bear no similarity whatsoever to conditions in buildings where MK-3 sprayed fireproofing has been installed. The fact that prolonged exposure to airborne asbestos fibres at high levels in industrial settings may lead to illness is not, and has never been, disputed by the Grace Defendants in these proceedings. That much is clear from the *pleadings* -- see, for example, paragraph 5B of Grace Canada's Statement of Defence in which it is stated that the Plaintiffs "... were aware at all material times of concerns about the hazards of asbestos in certain circumstances, and that in certain circumstances asbestos could be hazardous to human health or workers' safety".

323 Obviously, the Grace defendants have not conceded that their product, MK-3, constitutes a "genuine and major threat to health". However, I do accept the plaintiffs' assertion that it is not necessary for them to prove that the MK-3 installed in the Building has actually caused an asbestos-related disease.

324 With that in mind, I turn to the evidence concerning the mineral asbestos and the asbestos-related diseases.

#### Asbestos

325 The word "asbestos" comes to us from the Greek word meaning "inextinguishable". It is a generic term used to describe a variety of hydrated silicate minerals that have several significant common properties: high tensile strength, high heat resistance and virtual indestructibility. Asbestos minerals can be separated into microscopically small fibres which are very flexible and absorb and filter well. They are the only mineral fibres that can be woven into textiles.

326 There are three principal types of asbestos in commercial use. The most common is chrysotile, generally known as "white" asbestos. Under a high powered electron microscope, one can see that it is made up of plates that have curled up, rather like a scroll. One of the expert witnesses called by the Grace defendants compared the appearance of chrysotile fibres to the old legal documents that were rolled up and tied with a ribbon. Something in the order of 90% to 95% of all the asbestos used in North America is of the chrysotile type, the majority of which has come from Canadian mines, primarily those in the province of Quebec.

327 The other principal types of asbestos, crocidolite and amosite, belong to a different mineralogical group. Their fibres

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appear as elongated crystals, are stiffer than chrysotile fibres, and can split up into needle-like shapes. Crocidolite is blue in colour and amosite is of a brownish hue.

328 In modern times, the principal use of asbestos has been in the construction industry. However, Dr. Gordon Bragg, one of the expert witness called by the Grace defendants, pointed out that:

There were [in the early to mid-1970s] and remain literally thousands of uses of asbestos. Later ones include vinyl asbestos floor tile, ceiling tile, building products such as pipes. Many domestic water systems in North America remain to this day supplied in part through asbestos-cement pipe. It's a sheeting material, it's a shingling material. It's used and remains in use today in a wide variety of friction products, brakes, clutches, things of this nature. It remains in part a building material in such forms as sheet.

In the '70s there was a large amount of sprayed-on fireproofing and acoustical use, and there was at that time and there remains in place at the present time, a lot of pipe and boiler insulation. It's used in heat exchangers and similar equipment as well.

329 It seems likely that asbestos will remain an important component of many such products for years to come.

#### The Asbestos-related Diseases

330 Concerns about the effect of exposure to asbestos dust and fibres were first expressed a long time ago -- seemingly as long ago as the days of the Roman Empire. But significant research into asbestos-related diseases did not begin until the early years of this century and, notwithstanding the vast amount of research that has been conducted since then, to this day the full relationship between asbestos and human health is not fully known or understood.

331 It is, however, generally agreed that the diseases associated with exposure to asbestos are:

- 332 1. asbestosis: the scarring or fibrosis of the substance of the lungs;
- 333 2. cancer: including lung, gastro-intestinal and other forms of cancer; and
- 334 3. mesothelioma: a rare and fatal tumour of the lining of the lung and abdomen.

#### The Expert Witnesses

335 The evidence of the several expert medical witnesses who testified during this trial was largely devoted to the consideration of asbestos generally and these three diseases. I think, therefore, that before I review their evidence, it will be useful to canvass their qualifications.

336 The plaintiffs called Dr. David Bates who provided a "historical" view of the state of knowledge regarding asbestos-related health risks as it existed within the medical, environmental and occupational communities in North America during the years 1973 to 1975, when MK-3 was installed in the Building. Dr. Bates was Associate Dean of the Faculty of Medicine at McGill University during the years 1964 to 1967 and Dean of the Faculty of Medicine at the University of British Columbia from 1972 to 1977. Following his term as Dean, Dr. Bates continued for several years as a Professor of Medicine and Physiology at U.B.C., and between 1978 and 1981 acted as head of the faculty's chest disease division.

337 Between 1973 and 1979, Dr. Bates was a member of the National Research Council of Canada's Committee on Air Quality. He served for several years on the Cardiovascular and Epidemiology study sections of the U.S. National Institute of Health, and for four years he was a member of the Scientific Review Panel for Health Research for the U.S. Environmental Protection Agency.

338 Dr. Bates is a contributing editor of the *American Journal of Industrial Medicine*. He is one of the co-authors of a

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major medical text dealing with the respiratory function, the lung disorders caused by various substances, and with many of the associated occupational issues. As well, he has authored or co-authored in excess of 200 medical/scientific articles, a number of which have to do with the field of respiratory function. Throughout his long and distinguished career, Dr. Bates has maintained a deep and continuing interest in the fields of lung disease, environmental medicine and air pollution, as well as those of science policy and medical education.

339 On the specific subject of asbestos-related diseases, the plaintiffs called Dr. Arthur Frank, who is a specialist in preventative medicine. Currently the Chairman of the Department of Preventative Medicine and Environmental Health at the University of Kentucky College of Medicine, Dr. Frank has a particular interest in environmental health. Prior to accepting his present position in 1983, he served for two years as the Administrator of the Environmental Sciences Laboratory at the Mount Sinai School of Medicine. Dr. Frank holds a number of fellowships and memberships, has taught extensively, and has published many articles, books and reviews regarding the health effects of asbestos.

340 Dr. Frank gave expert testimony regarding the public health hazards of asbestos, especially in relation to exposure to asbestos in buildings.

341 Four "medical" experts were called by the Grace defendants. The first was Dr. Peter Elmes, one of the early leaders in the field of asbestos-related lung disease research. He is recognized as one of the world's leading clinical epidemiologists in that area. Between 1959 and 1976, Dr. Elmes conducted research in that area, focusing especially on a group of insulation workers working in the shipbuilding industry in Belfast, Ireland, who were exposed to high levels of asbestos. Trained as a pathologist, Dr. Elmes personally examined the lungs of many of those in his cohort of insulators.

342 Dr. Elmes has been involved in most, if not all, aspects of asbestos research. His knowledge and expertise was acknowledged when, in 1976, he was appointed Director of the Medical Research Council for Great Britain. The MRC was then responsible for all research conducted in Great Britain into dust diseases, particularly asbestos-related diseases. In addition to his own research, as Director of the MRC, Dr. Elmes also coordinated the work of other well-known researchers.

343 I found Dr. Elmes qualified to give expert evidence in the areas of general medicine, pathology and epidemiology, and to give evidence as a "state of the art" witness with regard to asbestos-related scientific literature and knowledge during the period 1955 to 1990.

344 Dr. Elmes defined "pathology" as the study of the abnormal changes that occur in the tissues of the body as a result of disease, and "epidemiology" as the study of the frequency and pattern of illness in groups of people, or cohorts, within a community, as opposed to illness in an individual.

345 The next expert called by the Grace defendants was Dr. Andrew Churg, Professor of Pathology and Head of the Department of Laboratory Medicine at the University of British Columbia. Dr. Churg is one of the leading research scientists in the areas of pathology and lung burden in relation to asbestos. He has served on many important medical committees reviewing the work of other scientists, such as the Medical Research Council of Canada (Grant's Committee for Respiratory Disease); the Canadian Mesothelioma Reference Panel; the Canadian Lung Tumour Reference Panel; the U.S. Mesothelioma Reference Panel; the U.S./Canada Mesothelioma Reference Panel; and the Pneumoconiosis Committee of the College of American Pathologists and the National Institutes of Occupational Health and Safety.

346 That Dr. Churg is recognized as one of the top experts in the world with respect to pathology and lung burden studies was attested to by Drs. Bates and Frank, as well as by plaintiffs' counsel who observed that he is "... a leading pathologist in the field of respiratory diseases, in particular those related to asbestos".

347 Dr. Churg was qualified as an expert in anatomic pathology, specializing in diagnostic and research expertise in occupational lung disease, with particular reference to disease caused by exposure to asbestos.

348 Next, the Grace defendants called Dr. Ronald Crystal. He is head of the pulmonary branch of the National Heart, Lung and Blood Institute at the National Institute of Health in Bethesda, Maryland, U.S.A., a large biomedical, clinical and research facility that operates under the auspices of the United States Public Health Service. One of Dr. Crystal's

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responsibilities is to oversee the work of a research group, comprised of some thirty physician/scientists, that is focused on understanding the cause, pathogenesis and treatment of a variety of lung disorders, including those relating to asbestos. As well, he carries out his own laboratory studies and sees patients who have been brought to the Institute from all over the United States and other parts of the world for evaluation and treatment.

349 Dr. Crystal has served on a number of editorial boards, including those of the *American Journal of Medicine*, the *American Review of Respiratory Disease*, the *Annual Review of Medicine* and the *Lancet*. He has authored or co-authored nearly 400 scientific papers which have been published in peer-reviewed journals.

350 Dr. Crystal is a specialist with respect to the functions and diseases of the lung. He is knowledgeable about epidemiology in the sense that, since 1968, he has been applying the tools and theories of epidemiology to his work, and he considers himself as expert in assessing the risks of contracting asbestos-related diseases.

351 Dr. Crystal was subjected to a long and searching cross-examination on his qualifications, following which Mr. Roberts submitted that he ought to be allowed to give opinion evidence only in the area of his own personal experience and expertise, and ought not to be allowed to state opinions on the health effects of asbestos.

352 I rejected that submission and held that, on the basis of his own experience, clinical research and studies, as well as his general knowledge and familiarity with the works and studies of others, Dr. Crystal was well qualified to give expert opinion evidence regarding what I will describe as the pulmonary function of the lung and diseases of the lung, including asbestos-related diseases.

353 Later, while Dr. Crystal was giving evidence and in argument, Mr. Roberts suggested that little weight should be given to Dr. Crystal's evidence. He submitted that because he is not a lung pathologist, did not carry out asbestos fibre lung burden analysis, and is not an asbestos-disease epidemiologist, and his opinions are therefore dependent on the work of others, such as Drs. Churg and McDonald, they carry little, if any, weight.

354 I disagree. Dr. Crystal gave valuable evidence regarding the anatomy and function of the lungs, as well as the problem of plural plaques, which, according to the plaintiffs' case, are caused by "low level" exposure to asbestos and are a precursor of mesothelioma.

355 The fourth and last expert medical witness called by the Grace defendants was Dr. John Corbett McDonald. A medical doctor with extensive training in the areas of occupational health and medicine, Dr. McDonald has spent the major part of his long and distinguished career as an epidemiologist in the study of occupational health issues.

356 Dr. McDonald has been closely involved in asbestos-related research since 1964. He has conducted extensive research into asbestos and its relationship with various lung diseases and, during the course of his career, he has acted as consultant to several governmental and regulatory bodies, including the World Health Organization, the U.S. National Institute for Occupational Safety and Health (NIOSH) and the Environmental Protection Agency (EPA), and to the governments of Quebec, Ontario, the United Kingdom and Sweden.

357 Dr. McDonald is a member of the Royal College of Physicians of London, a Fellow of the Royal College of Physicians of Canada, and a Fellow of the Faculty of Community Medicine of the Royal College of London, Ireland and Scotland. He was the first professor and chairman of McGill University's Department of Epidemiology and Health, following which he became professor and director of the London School of Hygiene and Tropical Medicine at London University. Later, he returned to McGill University as professor and director of the School of Occupational Health. He is now professor emeritus of epidemiology at McGill as well as being Chairman of the Department of Clinical Epidemiology in the University of London.

358 Dr. McDonald gave expert testimony concerning the epidemiological and occupational medical health aspects of pulmonary lung disease, with particular reference to asbestos-related lung disease. He is one of the acknowledged world leaders in his field.

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## The Evidence

### *Dr. Bates*

359 In a written report Dr. Bates described in some detail the "slow evolution of understanding of the risk from asbestos fibres". For my purposes, it will suffice to focus, as did Dr. Bates, on the proceedings of a conference convened by the International Agency for Research on Cancer ("IARC") and held in Lyon, France, in October 1972.

360 IARC is an organization composed of representatives from many different countries, including all of the major industrialized nations. Its function is to provide a forum in which current scientific knowledge relating to materials, chemicals and other substances thought to be carcinogenic may be examined and shared, and to "categorize" those materials in relation to their proven carcinogenicity. Periodic conferences are held and reports of the proceedings are published.

361 The 1972 IARC Conference was held for the specific purpose of discussing the biological effects of asbestos. The published report of its proceedings contains many scientific papers, as well as summary sections covering the state of knowledge in the main areas of epidemiology, pathology, physics and chemistry. Dr. Bates described the IARC Report as a "unique resource" for the purpose of summarizing the state of knowledge and understanding in this area at that time. That view was endorsed by Dr. Elmes, who was one of the presenters at the 1972 Conference. When he testified, he confirmed that the answers and opinions set out in the Report were given by leading asbestos health experts from around the world, and reflect the state of knowledge at that time about asbestos and its effects on human health.

362 By way of background: in 1963 a planning group was set up to consider the organization of an international investigation of the cancers associated with exposure to asbestos dust. That was followed, in October 1964, by an international conference on the biological effects of asbestos, held in New York City under the sponsorship of the New York Academy of Sciences. Dr. Bates, then a fellow of the Academy, attended that conference and, according to his recollection, it focused the attention of the scientific and medical communities on the new data that had been gathered on the hazards of asbestos.

363 Following the 1964 conference, a group was set up to do further work on the subject of asbestos, and that led to the full-scale "working" conference of IARC held in Lyon, France, in October 1972.

364 Public attention was drawn to the evolving debate when, in 1968, the *New Yorker* magazine published a series of articles written by Paul Brodeur that, amongst other things, described the first lawsuit arising in relation to mesothelioma. According to Dr. Bates, Brodeur carefully documented his facts, and he described the articles as "researched medical journalism" that commanded considerable attention. Then, in 1969, a comprehensive bibliography of world literature on asbestos was published in South Africa. Dr. Bates described these publications as "sign posts" leading up to the 1972 IARC Conference.

365 In the Introduction to the Report of the 1972 IARC Conference, it is stated that:

The modern asbestos industry dates from the discovery in the 1870s of large deposits of chrysotile fibre in Canada and Russia, followed by the commercial exploitation of three other types of fibre -- crocidolite, amosite and anthophyllite. Previously regarded as curiosities, these fibrous silicate minerals rapidly found applications, including large-scale use in fire-proofing and reinforcement for cement in building materials. There are now numerous products which depend on asbestos, some of which require specific types of fibres. This demand has led to a vast increase in production to the present level of more than four million tons per annum. As no satisfactory substitutes have been found for many of these uses, asbestos is likely to remain an essential material for years to come.

By the 1950s it was accepted that the inhalation of asbestos dust could lead to pulmonary fibrosis and carcinoma of the lung, and more recently that an association exists between exposure to asbestos dust and the development of diffuse mesotheliomas of the pleura and peritoneum. The mesotheliomas appeared to occur after a long lapse period, forty years, following in some cases only slight exposure to asbestos dust. Anxiety that sufficient exposure to produce mesotheliomas might occur in non-industrial situations indicated a need for urgent assessment of the

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situation. It became essential to establish which type, or types, of asbestos were responsible for the development of the conditions, and to clarify the evidence through epidemiological and experimental studies. It might then be possible to suggest methods for the prevention of the diseases ...

With the establishment of the International Agency for Research on Cancer, it was considered that the asbestos problem, which was now being investigated by epidemiologists, morbid anatomists, experimental pathologists, physicists and chemists, was exactly the type of study to be integrated into the Agency's programme of environmental carcinogenesis. Accordingly, a research agreement was concluded with the Agency in 1968, and in 1970 the project was expanded with the Agency's support. The following year it was decided that a further meeting of the working group was appropriate to review the progress that had been made in implementing the 1964 recommendations and to collate the information now available on these cancers.

As it was considered that the situation should be reviewed on a wide basis, the working party was requested to "assess the biological effects of asbestos". Authorities on various aspects of the problem were invited to submit papers which were circulated beforehand and presented for discussion; these were summaries by rapporteurs ...

This study has completed what we consider to have been a successful eight-year phase. The proceedings of the conference and the recommendations of the advisory committee to the IARC have now been prepared as a publication, which we trust will provide an authoritative international review of the asbestos cancer problem and show where research is most needed.

366 At the 1972 Conference, Dr. Irving Selikoff, one of the pre-eminent researchers in the field of asbestos-related diseases, discussed his study of a cohort of asbestos insulation workers and stated his conclusion that:

A serious cancer risk has been demonstrated among asbestos insulation workers in the United States. Approximately one in five, an extraordinary incidence, has been the result of lung cancer ... We were not able to find evidence that the use of chrysotile in insulation work was associated with a greater risk than was amosite or vice versa.

367 Some of the data presented at the 1972 Conference illustrated the feasibility of reducing the contamination of the environment by asbestos dust. For example, in a "Discussion Summary" published as part of the Report, Dr. V. Timberell of the M.R.C. Pneumoconiosis Unit, Llandough Hospital, Wales, noted that asbestos-cement spraying had often been documented as a significant source of environmental exposures. Referring to a U.K. study of an asbestos spray-fireproofing operation which employed a pre-dampening apparatus and a wet-sprayed process, during which the applicators wore protective clothing and close-fitting respirators covering the nose and mouth, he reported that:

The fall-out of asbestos fibre was studied as it affected the asbestos spray workers, other workmen on the building site and neighbourhood contamination. The results illustrated the dust control that can be achieved even in such difficult conditions ...

No stray fall-out of fibre in the surrounding neighbourhood was observed during or after the spray operation. The important point was made that whereas the fall-out of fibre in the vicinity of the spray operation was relatively small and the operators were protected by their respirators, other workers on the building site were possibly subsequently at risk when handling the dried waste.

368 Drs. W.J. Nicholson of the Environmental Sciences Laboratory, Mount Sinai School of Medicine, New York, and F.L. Pundsack of the Johns-Mansville Research Centre together presented a paper, entitled "Asbestos in the Environment", in which they observed that:

Once an asbestos-containing product has been manufactured, whether or not it constitutes a source of asbestos in the environment will depend to a great extent on whether or not the asbestos is firmly "locked-in" the product with a binder, saturant, coating or bonding agent such that normal handling, application and use do not release it. Asbestos cement products are a good example of "locked-in" products which probably do not constitute a significant source of asbestos to the environment under normal conditions of use. On the other hand, the use of asbestos in spray-on



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fireproofing compounds is an example of a non locked-in use. The major source of environmental contamination in this case is the application of the spray itself and the subsequent dissemination of airborne asbestos fibre from the application site. This problem is serious enough that asbestos spraying has been banned in a number of cities in the United States.

369 Also discussed at the 1972 Conference was the work of Dr. Stanton, who had been investigating the possibility that it was the size and shape of the fibre that caused the disease and not its chemical compositions. The "Stanton Hypothesis" is that long, narrow fibres are the most hazardous, and it remains part of the dogma on asbestos health effects to this day.

370 There was some discussion of pleural plaques at the 1972 Conference. It had been discovered that in persons exposed to asbestos, small areas of the outer lining of the lung -- one of the two layers of pleura surrounding the lungs -- would sometimes thicken into "plaques" about the size of a walnut. This condition had been detected on X-rays made during surveys of British and Swedish shipyard workers, and it was found that a much higher percentage of those workers suffered from pleural plaquing than the general population. At the time, although the fact had been established, no one really knew what it meant, and the plaques were not then considered to have an adverse effect on the functioning of the lung.

371 Dr. Bates explained that, at the time of the Conference, the systematic classification of X-rays of various occupational diseases, including asbestosis, was just beginning. This led, in due course, to a classification system which enables information about cases being studied to be clinically summarized in terms of the extent of the radiological change.

372 By 1972, a start had been made in identifying fibre quantities and types in the lung, particularly in cases of mesothelioma, but nothing was then known about the rates of clearance of various types of fibres from the lungs.

373 The 1972 IARC Report notes the importance of clarifying "the relative amounts and types of fibre encountered by occupationally exposed individuals, by those classed as environmentally exposed, and by the general population". It also notes that threshold limit values had been lowered over the years, and that detailed codes of practice had recently been issued in the United Kingdom. In 1968, the British Occupational Hygiene Standard of 2 fibres per millilitre of air had been established as a level "designed to limit to 1% the risk of contracting the first signs of asbestosis". There was much debate about this, as to whether or not it was too stringent, and how much safety was built into it. Recommendations were made for future studies to increase understanding of the relationship between dose and outcome. Simply put, the concept of "dose-response" is that the higher the dose of some entity to which one is exposed, the more likely it is that one will develop a disease from that entity. It is a matter which, in relation to asbestos exposure, has engaged the attention of many research scientists, and about which a good deal of evidence was led during this trial.

374 Dr. Bates also referred to the consideration given to the possibility of there being different dose-response levels in relation to lung cancer and mesothelioma. He said that while the exposure data then available aroused a good deal of controversy, there was simply not enough information available at that time to make any estimate of the degree of risk in relation to the extent of exposure -- i.e., the "dose-response relationship". That, he said, "comes through clearly in the report".

375 Dr. Bates testified that at the 1972 IARC Conference it was concluded that:

1. The risk of asbestosis was dependent on dose.
2. Smoking, combined with exposure to asbestos, greatly increased the risk of lung cancer.
3. While the possibility of environmentally-induced mesothelioma was recognised, it was thought that exposures had probably been high. It was also recognised that mesotheliomas occurred without known asbestos exposure and with very few fibres in the lung in some cases, but the interpretation of this was unclear.
4. Air sampling revealed that a significant number of asbestos fibres might be in the air some distance from where it was being sprayed, and the presence of asbestos fibres in the lungs of city dwellers was recognised.
5. There was insufficient data to deduce a dose-response curve for the risk of mesothelioma in relation to exposure.

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It was suspected that crocidolite (Blue asbestos) induced mesothelioma more readily (and probably therefore at lower doses) than chrysotile asbestos.

6. There was a suspicion that substances other than asbestos, but occurring with it (such as benzopyrene), might contribute to the carcinogenicity.

7. The general dangers posed by handling asbestos were understood; but concentration of attention on the induction of asbestosis as the sole outcome led some to adopt the view that high exposures were necessary for most effects. There was no detailed discussion of the level of risk (to cigarette smokers) of low level environmental exposures.

**Dr. Frank**

376 Dr. Frank gave evidence about the health hazards of asbestos, as they are known today, with particular emphasis on exposure to asbestos in public buildings.

377 Testifying as a public health specialist, he discussed the three major diseases associated with exposure to asbestos: asbestosis, lung cancer and mesothelioma. He acknowledged that asbestosis is related to high-level exposure, that is, those levels of "occupational exposure" traditionally experienced by insulation workers and, to a lesser extent, by construction workers in allied areas such as electricians, plumbers and sheet metal workers. However, he opined that asbestosis can also be caused by periodic or episodic high level exposures, such as those that were in the past experienced by family members, primarily women cleaning their husbands' contaminated work clothes. According to Dr. Frank, as scientists have expanded the horizons of their research from the traditional miners, millers and asbestos insulators to other employed groups, they have found evidence of asbestos-related disease in every group exposed to asbestos.

378 At the other end of the continuum, he said, is the level of asbestos exposure one finds in the ambient air; that is, the air that surrounds us on the streets and in our buildings. It seems that there are always asbestos fibres in the ambient air -- some because it is a naturally occurring material that releases fibres as it weathers, and some coming from products such as car brake linings. Dr. Frank stated that the exposure level found in buildings would, in relative terms, be "low-level" exposure, and that, so far as exposure in buildings is concerned, the problem is not with respect to asbestosis. He would not expect to see cases of asbestosis occurring in occupants of office buildings, other than, "perhaps", in maintenance workers.

379 Dr. Frank testified that it is becoming increasingly clear that it is the fibrous nature of asbestos that is the key element in the causation of the two malignant diseases, lung cancer and mesothelioma. He said that there is no doubt that lung cancer, mesothelioma (and in his opinion, cancers of the gastrointestinal tract as well) are associated with exposure to asbestos. He said that "... there's something about the fibre coming in contact with the cells that causes biological change, but the biological activity that causes cancer is not yet understood".

380 Dr. Frank stated that medical science does not know exactly how many mesotheliomas are associated with asbestos, but he thinks it well recognized and accepted that 85% to 90% of them are. He tells his students that "if you hear the word 'mesothelioma', the word 'asbestos' needs to pop into your head".

381 Dr. Frank spoke about the "Stanton Hypothesis", which, as I have noted, postulates that fibres of a certain size, regardless of their chemical nature, have the ability to produce cancer and that physical size is an important (but not the only) parameter of the production of cancer. He said that the size or group of fibres that Dr. Stanton found to be the most carcinogenic were those of 0.25 microns in diameter and greater than 8 microns in length (a micron equals one-millionth of a metre).

382 Dr. Frank testified that medical science does not really understand how asbestos produces cancer. He said that its fibrous nature is believed to be important, but that there are many unanswered scientific questions. Nevertheless, he testified, from a public health perspective, a great deal is known about the diseases caused by asbestos. He also said that those who are engaged in that field have "some sense" as to how people should be protected from exposure to asbestos.

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383 Dr. Frank set out three important biological principles which, he said, are relevant to an understanding of asbestos-related diseases, namely:

384 1. the dose-response relationship;

385 2. the latency period; and

386 3. the basic principles of carcinogenesis.

387 He said that the dose-response concept applies to viral diseases such as the common cold; to infectious diseases, such as tuberculosis; to industrial diseases, such as lead poisoning; and to those diseases related to asbestos exposure. It was Dr. Frank's opinion that:

Classically, for carcinogens there is no belief that there is a threshold and that if you can stay below this level, cancer will not occur. You can say it is less likely to occur. It is less likely to occur with a small dose but, since the biology involved is such that *all it takes is the so-called one-hit theory, one molecule, one unit of radiation -- and this is what is generally accepted, that there is no level below which you could not expect to see cancer.* (emphasis added)

388 In his written report, Dr. Frank stated his opinion that "[w]hile asbestosis occurs only after relatively high exposure, cancer can occur at any level of exposure". In other words, there is no "safe level" below which one would not expect the possibility of cancer developing. He stated that:

Cancer results from alterations of the basic nuclear biological material, the nucleic acids. The exact mechanism for the production of cancer is still poorly understood. There is some appreciation of how ionizing radiation or certain chemicals may alter the DNA structure, but for substances such as asbestos, this remains very much a biological enigma. However, what is well appreciated with all cancer causing substances is that the principle of dose-response clearly prevails, and that there is no "safe" level below which one would not expect the possibility that cancer would develop. *On a theoretical basis, one molecule of a carcinogen, one small bit of radiation, or one asbestos fibre has the potential for causing cancer. While this is both biologically unlikely, and from an epidemiological standpoint virtually impossible to prove, carcinogenesis theory tells us that this is a reasonable biological construct.* (emphasis added)

389 As to the view held by some that chrysotile is a weak carcinogen, Dr. Frank stated that, in his opinion:

The preponderance of scientific evidence to date show that all of the fibre types, including chrysotile, are capable of producing cancer, specifically, both lung cancer and mesothelioma. Human studies support this, as do classical animal investigations.

390 He further opined that:

... while it is rare in the general population, this unusual tumour is very common when associated with asbestos exposure.

391 Dr. Frank also expressed opinions concerning the risk to workers and occupants of buildings in which an asbestos-containing material is present. I will discuss that aspect of his testimony later, under the heading "Asbestos in Buildings".

#### **Dr. Elmes**

392 In 1959, Dr. Elmes began to study the medical literature relating to asbestosis and the other asbestos-related diseases. Since then, he has conducted historical research back to the beginning of the century and he has, at the same time, kept up-to-date and informed with regard to the scientific literature on the subject published up to 1990.